California State Journal of Medicine.

Owned and Published Monthly by the

Medical Society of the State of California

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ADDRESS ALL COMMUNICATIONS

Secretary State Society, - -
State Journal, - - -
Official Register, - - -
Butler Building, San Francisco.

Telephone Douglas 2537

IMPORTANT NOTICE!

All Scientific Papers submitted for Publication must be Typewritten.

Notify the office promptly of any change of address, in order that mailing list and addresses in the Register may be corrected.

VOL. IX MARCH, 1911. No. 3

EDITORIAL NOTES.

PRACTICAL HYGIENE.

Perhaps it is a good thing that, when the human breast begins to swell with pride, some graceless thorn comes along and punctures the swelling; we cannot get quite the amount of proudfullness we would sometimes crave. Which may be another way of saying that "a few fleas are good for a dog." Our friends and colleagues in the Southland take great pride in the Los Angeles *Times* and they brag about its influence in keeping Los Angeles an "open shop city" with nary taint of unionism in it. But just ask them about the attitude of the *Times* on things medical, and the pride seems to fade away and become as though it were not. The *Times* is owned and run by an antiquated gentleman, "General" (political) Otis, by name. When he was a "General" in the Philippines he had the nickname among officers and privates of "Mex" Otis. The "Mex" is a term used to refer to anything that is like the Mexican silver dollar, below par. "Mex" Otis seems to have had two passions in life; an undying hatred of labor unions and a thoughtless adoration of the Republican party. Incidentally, and of less moment, he has shown a decided antipathy to the medical profession, to everything pertaining to medical science or anything related thereto. It is generally believed that the *Times* never lost an opportunity to "hammer" the medical profession, singly or collectively. No other paper in the world would print the stuff that the *Times* does; no other paper in the world would print every Sunday the awful, inane, brainless, ethelized ravings that the *Times* does under the caption of "Care of the Body," "Practical Hygiene." In the "Care of the Body" columns, every Sunday, the *Times* prints the most wonderful and fearful mixture of twelfth-century quotations, interspersed with the personal maudlin-like comments of a curious individual named Harry Brook, "N. D." Were it not that there are such a lot of silly people always ready to believe any-old-thing they see in print, these vaporings would be but a huge joke. It is difficult to imagine a combination, other than that of "Mex" Otis and the Los Angeles *Times,* that would stand for the freak things that emanate from Harry Brook and disgrace any publication of the twentieth century.

ADVERTISING AGENCIES.

Some people seem to have a peculiar idea of their real place in the world of work; they seem to think it is their duty or their right or their prerogative to run other people's affairs for them. Thus the life insurance companies, a few years ago, considered it their duty or their right to fix the fees which physicians should charge for making examinations for life insurance. Most of them have gotten over that idea; the New York Life still is possessed of the obsession, however, and therefore it should receive the condemnation of every reputable physician; if all would follow the example of the physicians in San Mateo County, the New York Life would wake up. Some advertising agencies are good enough to offer your JOURNAL an occasional advertisement at most ridiculous rates; it might be suspected that the advertiser was paying regular rates to the agency and the agency "appropriating" (that is a mild word) most of the amount. Be that as it may, we desire to take this opportunity to say to such agencies that we are not a hold-up game, we are not an object of charity, we have not the official hat extended for receiving stray pennies of the charitable passing, nor yet are we an eleemosynary institution. We have definite advertising rates; we are glad to print proper advertisements at those rates; we deliver the goods we agree to deliver; we do not ask any favors from anyone; advertising is a business proposition and we are in the publishing business—we are not here to be a party to the scheme of helping someone else get money from an advertiser for that someone's own personal benefit. We may add that this simple policy pays. A number of our advertisers have recommended this JOURNAL to other advertisers; a large number of our readers have responded to our request to consider this question of advertising, have read the editorial notes on the subject from time to time, make it a rule to look through the advertising pages, and find that it is distinctly to their advantage to do so. Recently an advertiser wrote us that he had made a number of excellent sales from his advertisement in one issue, and stated that three or four people had voluntarily referred to an editorial on the advertising question. "It pays to advertise"; yes, and it pays to read advertisements. Do it; read those in your own JOURNAL.

PROGRESS OR CARELESSNESS.

Is medicine making such rapid advances that an opinion which is correct to-day will be incorrect six months hence? Are we advancing so rapidly in all matters pertaining to general medicine that a paper written this month will be obsolete a year from now? There are a few well-defined and specific medical conundrums the answers to which we seem to be within hope of securing before long; and in a few other directions distinct advances are made at frequent intervals. But speaking generally, is it so? These questions are prompted by several requests that have been received to return manuscript sent in to the JOURNAL for publication six or eight months ago. (Parenthetically, it may be remarked that the pressure on the columns of the JOURNAL was never greater than during the last year; some papers had to be held back for quite a while.) But why should a man who read a paper before some society last June, now think that the paper ought not to be published because it is a few months old? If it was worth writing and presenting at that time, is it not worth reading to-day? And if it is not, then what is the reason? Was it a good paper when read? Has medical science advanced so far, in the few intervening months, that what was true then is untrue now? It would hardly seem to be so. One is naturally loath to suggest that this peculiar condition of things could be due to carelessness on the part of the authors; and yet, aside from some single point about which an added word may have been said recently, it is about the only plausible explanation. Things like "606" do not come along every day to make men recall the opinion of yesterday. (Again, parenthetically, we may ask whether some of the present-day expresions of unbounded faith in "606" will not be regretted in six months' time; already reports of unexpected happenings are accumulating.) It is well to be a little "slow in the head"; if you are right to-day, you will be just as right a year from now; if science has advanced in the year beyond the world's knowledge of to-day, you need not be ashamed of it.

INCREDULITY VS. GREATNESS.

Occasionally, as the centuries have come and gone, a great truth has been voiced only to be clamorously quashed by the tumultuous outcries of the incredulous. Thus we have reached a condition in which the mass of the people, when any would-be great truth is announced by a would-be discoverer and is met by incredulity, assume that the incredulity is an unequivocal acknowledgment of the truth underlying the discovery. To call attention to the fallacy of this line of argument seems quite superfluous; and yet it is an argument that has a tremendous sub-conscious influence on a great many people; the argument of analogy is the most subtle and the most fallacious of all arguments; therefore it is the most dangerous. All of which is suggested by some occurrences in the San Francisco County Medical Society during the past two months. A certain physician claimed that he had discovered a wonderful vaccine with miraculous powers of a curative nature over everything from acnae to typhoid fever, including "housemaid's knee." The vaccine apparently consisted of a miscellaneous collection of germs, in more or less haphazard proportions, measured not by cubic centimeters but by so many "whisky flasks," and also containing some ingredient or ingredients which the "discoverer" was not prepared to announce, as he had turned the "discovery" over to a pharmaceutical house, for manufacture and exploitation. It is truly possible that a great truth may lie concealed in the "whisky flasks" of cultures; all things are *possible*. But that is not to say that all things are true—or even probable. It is difficult to see how such a dubious question could come before a learned society and excite its members to the extent which this question did, except on the assumption of the general tendency to believe that incredulity must necessarily mean discovery.

"CARE OF THE BODY."

If the dicta of the "Care of the Body" columns in the *Times* were written late at night and under the stimulus of wormwood or ethylated decoctions, one could understand it all; but presumably they are not so written. At any rate they are, apparently, published in good faith and not as "Joe Miller" notes. Listen to the words of "science" as they flow from the Brook in Los Angeles: "All disease is an effort of nature to expel from the system morbid matter . . . it should be encouraged, instead of being suppressed."

". . . the injection of filthy animal virus into the blood, a practice that has now been going on for a number of years, has been a contributary cause to the great increase in later years of such an awful disease as cancer, and to the rapid spread of the 'great white plague.'" And this in view of the wonderful fall in the death rate from diphtheria alone! Congratulations, "Mex"!

". . . the modern medical theory of germs is a colossal error that has led to an immense amount of false treatment and unnecessary deaths."

Of course all this has no relation whatsoever to an advertisement which appears on the same page and in the next column, in the *Times:*

"Hygienic Advice by Mail. By Harry Ellington Brook, N. D., Editor Care of the Body. How to cure yourself of chronic disease by the Natural Method. For particulars and terms, send stamped, directed envelope to Harry Ellington Brook, P. O. Box 612, Los Angeles."

This is probably the only instance on record of a newspaper openly giving its reading columns to the promotion of a quack. It would be worth while for the Post Office people to look into the matter with the object in view of issuing a fraud order against this person who, for "terms" will tell you how to cure yourself of "chronic disease." No one in the world but "Mex" Otis would "put this over." Too much pride is not good for anyone.

PRELIMINARY PROGRAM OF THE

FORTY-FIRST ANNUAL MEETING OF THE MEDICAL SOCIETY OF THE STATE OF CALIFORNIA, SANTA BARBARA.

APRIL 18TH, 19TH and 20TH, 1911.

Notice: The meeting is to be held at the Hotel Potter where special rates on the American plan have been made for our members.

Railroad Rates. The usual rate of one and one-third fare for the round trip will be in force. Pay your full fare for the going ticket and be sure to get a receipt certificate, which must be signed by the Secretary at Santa Barbara. The return ticket will then be sold to you for one-third fare.

Reservations for rooms should be made as soon as possible so that the hotel may properly take care of your comfort. Address the Hotel Potter, Santa Barbara.

Remember the date—April 18th, 19th and 20th, 1911.

Session on Eye, Ear, Nose and Throat.

"The Eye in Its Relation to General Medicine" .....Dr. Herbert C. Moffitt, San Francisco

"The Value of Wassermann Reaction for the Eye, Ear, Nose and Throat Surgeon" .....Dr. Kaspar Pischel, San Francisco

"The Eye in Its Sensiological Aspect"..... .....Dr. William E. Blake, San Francisco

"Report of a Case of Carcinoma of the Eye-lid" .....Dr. Hugo A. Kiefer, Los Angeles

"The Value of the Graphic Method in the Study of Speech Defects"..... .....Dr. Henry Horn, San Francisco

"Report of Case of Mikulicz Disease"..... .....Dr. James A. Black, San Francisco

"A Résumé of the Modern Operative Procedures of the Ear"..... .....H. B. Graham, San Francisco

Session on Internal Medicine.

"Some Types of Intestinal Indigestion in Children".....Dr. R. L. Porter, San Francisco

"Intestinal Indigestion in Adults"..... Drs. E. Schmoll and W. C. Alvarez, San Francisco.

"Intestinal Indigestion from a Surgical Point of View".....Dr. Rae Smith, Los Angeles

Discussion opened by Dr. Dudley Fulton, Los Angeles.

"Medical Aspects of Vaccine Therapy"..... .....Dr. Herbert C. Moffitt, San Francisco

"The Wassermann Reaction in Various Diseases".....Dr. H. R. Oliver, San Francisco

"Clinical Types of Osteo Arthritis of the Spine" .....Dr. C. M. Cooper, San Francisco

"Arteriosclerosis; Review of Cases"..... .....Dr. Donald Frick, Los Angeles

"The Relation of the Tonsils to Tubercle Bacilli"...Dr. Carl C. Warden, Los Angeles

"The Treatment of Hemoptysis in Tuberculosis".....Dr. Max. Rothschild, San Francisco

"Relative Insufficiencies of the Myocardium" .....Dr. H. D'Arcy Power, San Francisco

"Substances Derived from Leucocytes and Their Protective Value"..... .....Dr. Hans Zinsser (by invitation)

"The Experimental Basis for Vaccine Therapy" .....Dr. F. P. Gay (by invitation)

Session on General Surgery.

"The Surgical Significance of Papillodema".. .....Dr. Leon W. Mansur, Los Angeles

"The Diagnosis of Certain Peculiarly Situated Intracranial Growths" ....Dr. Thomas J. Orbison, Los Angeles

"The Indications, Technic and Results in Decompressive Operations" ....Dr. Wallace I. Terry, San Francisco

"Report upon Studies of Hydrocephalus, Cases Number Two and Number Three"..... .....Dr. Harry M. Sherman, San Francisco

"The Surgical Management of Subtentorial Cysts and Tumors"..... ..Dr. Andrew Stewart Lobingier, Los Angeles

Discussion opened by Dr. Stanley Stillman, San Francisco.

"Left Sided Colon; Failure of Rotation of the Primary Gut" ....Dr. Emmet Rixford, San Francisco

"Acute Hydro Nephrosis; Operation; Specimen"..Dr. William A. Edwards, Los Angeles

"Intestinal Hemorrhage in Hernia"..... .....Dr. Rexwald Brown, Santa Barbara

Session on Nervous and Mental Diseases.

"The Treatment of Tic in Children"..... .....Dr. E. C. Fleischner, San Francisco

"Educational Methods in the Mentally Defective".....Dr. J. Ross Moore, Los Angeles

"Mental Hygiene and Prophylaxis"..... .....Dr. G. V. Hamilton, Santa Barbara

"A Clinical Study of Korssakow's Disease"... .....Dr. A. W. Hoisholt, Stockton

Session on Obstetrics and Gynecology.

"Pus Tube Complicated by Ectopic Gestation with Report of a Case"..... .....Dr. E. M. Lazard, Los Angeles

"Prophylaxis of Toxemia During Pregnancy" .....Dr. Titian J. Coffey, Los Angeles

"Caesarian Section; Report of a Series of Cases".....Dr. M. L. Moore, Los Angeles

THE MOSZKOWICZ TEST.

It has been recognized for many years that the line of demarcation in senile or presenile forms of arterial gangrene is not a safe point at which to amputate. Above the dead zone there is an ischemic area marked by great pallor, which will inevitably lead to sloughing if it be chosen as the point of election in surgical intervention. The test proposed by Moszkowicz of Vienna in 1907, and which has recently been commented upon at length by Matas of New Orleans, marks a distinct advance in our ability to determine just where to amputate; Bergmann, in Lexer's Clinic, Mendelsohn, Konigsberg and Crile have all confirmed the value of this hyperemic test, as it may well be called. The procedure is as follows:

The limb being rendered ischemic by elevation and by the application of an Esmarch bandage in the usual manner to the groin, several turns of the constrictor are made and the arterial blood supply shut off for a period of five to ten minutes. The tourniquet is then quickly loosened and this is followed by the well known hyperemic blush which travels down the limb.

This blush proceeds rapidly until the obstructed territory is approached, where its progress becomes slow. The lowest point reached by the hyperemic blush is the lowest limit of safety for operation. Amputation must be made well within the hyperemic territory.

The value of Moszkowicz' work is due to one important fact which he established, that the hyperemic blush extends to the level of the obstruction in the main artery of the limb. This he determined experimentally by means of injecting colored fluids into the vessels of a cadaver, after tying the main artery at various levels; it was found in all cases that the skin was discolored by the fluid down to the point at which the main artery was tied, but not beyond it. In a recent operation for gangrene of the foot, in the service of Dr. Sherman at the University of California Hospital, this test proved most satisfactory. It was further determined that a thrombus was present in the popliteal at the point to which the hyperemic blush had extended. So far this principle has been applied mainly to determining the line of amputation in cases of gangrene, but Matas has gone a step further by adapting it to the purpose of testing the collateral circulation in cases of aneurism. In his recent article "Testing the Efficiency of the Collateral Circulation" *Annals of Surgery*, January, 1911, he makes this important observation: "In healthy normal limbs, the occlusion of the main artery of a limb does not, necessarily, suppress the hyperemic wave in the distal parts below the obstruction, as long as the collaterals are pervious and sufficient to carry the blood beyond the level of the obstruction in the main artery."

R. R.

NEWSPAPER INFLUENCE.

Collier's Weekly has at last begun the publication of a series of articles by Will Irwin, on the newspapers of the United States. The foreshadowing of the first article indicates that the series will be much read and discussed. To anyone who loves to study the interesting problems in the world about him, and particularly the quiet, profound changes that are constantly occurring or in process of development, these articles will be of great interest. The influence of the newspaper, Irwin truthfully points out, was never greater than it is to-day, though the influence of the editorial columns is practically dead. The newspaper has changed its method as a man changes his clothes; the black "Prince Albert" of newspaperdom has been put away and a "natty" suit of business tweeds has taken its place. Newspapers to-day have a great influence through the news that they print—or do not print—and the color which they give to it. But the newspapers are slow to accept what has been forced upon all reputable periodicals except the daily papers—responsibility for advertising. In the end, it will be the advertisers who will force the newspapers to a cleaner policy in this respect; decent advertisers will not patiently continue to have their announcements sandwiched between patent medicine and lost manhood frauds. This changed policy of the daily press in regard to news has had another and a very profound effect; it has educated the public in many ways, and the public now insists that the process be continued. Not so many years ago, hardly a paper in the country would have printed such stories as the connection of Aldrich, maker of tariff schedules, with the rubber trust (one is tempted to write it "robber trust"); as the connection of Sherman with the Indian land frauds. The people are learning their power; the newspapers are powerful, but the people who make the newspapers are still more powerful—and they are waking up to that fact. Advertising is a necessary adjunct to publication, and a very valuable one; it is valuable to the reader and to the buyer. Big advertisers know this and are advertising in big ways. A certain manufacturer of tooth paste is spending hundreds of thousands of dollars advertising the fact that conservation of health is conservation of our greatest national resource; and keeping the teeth clean helps a lot. Read the advertisements in your own JOURNAL; they are all good things; we are responsible; it will pay you and it will pay the advertiser.

VIAVI FAKES.

The Viavi fake, being, as it is, such a monumental one, and so very profitable to those admirable citizens and pious gentlemen, the Law brothers, has created many would-be similar fakes. A short time ago we referred to one—Pond's tampons. There are many of them and from some things that seem to act as straws in a breeze, "olivoint" would appear to be headed in that direction. The Millennial Medical Company, with its "millennial medicated capsules," is certainly in the list, if one may judge from a circular recently distributed. But these little fellows are just clumsy; true, they may be also deadly, as when they imply that cancer may be prevented or cured by the use of their stuff. They all forget that what has made the monumental success of the Viavi fake is not the fake itself—it is the keen, shrewd, cunning brain of the little Law brother, one of San Francisco's most wealthy and distinguished citizens. It is not the three little shells and the elusive little pea that are so valuable to the "shell game" faker; it is the dextrous way in which he works the fake. The promoters of these clumsy imitators of the Viavi fake will never get to be directors of the Young Men's Christian Association; they have not the guiding genius of the little Law brother to manipulate the fake; and you can bet he would not rub "viavi cerate" on his belly if he had appendicitis!

CAUSES OF DEATH.

From the Department of Commerce and Labor, Bureau of the Census, comes a little vest-pocket pamphlet with the title "Physicians' Pocket Reference to the International List of Causes of Death." (Comment for thought: There is nothing pertaining to medicine or public health that comes to medical men from a medical or public health department of the national government. Matters of medical or public health interest percolate through the Department of Agriculture or the Department of Commerce and Labor or the Treasury Department. Everything is worth something, commercially, except life and health!) To make a guess at the probable truth, this little booklet is the result of the trying problems presented in compiling the last census rather than a voluntary effort on the part of the government to advance or in any way promote medical science or the public health. But whatever the reason for its publication—and one should not "look a gift horse in the mouth"—it ought to be in the possession of every physician in the United States and it ought to be carefully read—and followed as closely as may be. If one were to follow some of the suggestions closely, he might, at times, be somewhat prolix. For instance, in answering specifically and in detail No. 35: "Disseminated Tuberculosis (Specify organs affected)." One is reminded of a distinguished member of the Society who, some years ago, reported the post-mortem findings in a case of leprosy in a Chinaman who had been under the observation of this physician for a number of years. The gentleman in question, in presenting the specimens, was very apologetic. *He stated that the post-mortem had been performed in a small hut and in very hot weather and therefore he was able to bring with him, and present to the Society,* ONLY *the brain, the spinal cord, the right arm, the left hand, the right foot and a few miscellaneous specimens of dermatic lesions!*

FEES FOR EXAMINATIONS.

The old fight for merely decent compensation for making examinations for life insurance risks is by no means dead. Only a few months ago it was brought very much to life in San Mateo County. The New York Life Insurance Company, one of the richest and one of the oldest and worst offenders in the matter of cutting fees, had refused to pay a minimum of $5.00 to a member of the Society who had been its examiner. He refused to accept the proffered $3.00, declined to make any more examinations for that company and reported the whole matter to the Society at a regular meeting. Physicians are so easy-going in all their personal business matters that they have made themselves the prey of almost any one who may undertake to impose upon them. It would have been so easy, a few years ago when the New York Life started this cut-rate insurance fee business, if all the examiners had absolutely refused to accept the reduced fees or make the examinations, and if the newly appointed examiners had done the same thing. Now, however, it is different. Some of the companies have so much money and so much business that they do not care very materially whether they get any more or not. But the arrogant New York Life would come to time if all the physicians in the country would refuse to make examinations for $3.00.

REMARKABLE SUIT WON.

The suit against Dr. Rae Smith, of Los Angeles, for $50,000 for malpractice, was recently fought out in the courts, the verdict being for the defendant, Dr. Smith, the jury taking about ten minutes in coming to their decision. It is said to be one of the most remarkable suits in the history of American jurisprudence. It consumed nine days in the trial and the plaintiff, during the course of the suit, submitted to an operation in order to demonstrate that he did *not* have a tumor in his abdomen which some half-dozen or more physicians testified *did* exist and which two physicians testified did not exist. So confident was he in his own judgment that he insisted upon the operation; the tumor was found to be present, and the man who, previously, was fairly comfortable (with a colostomy, to be sure), has sacrificed his life. This is the first suit to be tried in court and defended by the Medical Society of the State of California under our Medical Defense plan, and the outcome is gratifying in the extreme. The attack upon Dr. Smith, whose treatment was absolutely correct, was exceedingly bitter and it is most unfortunate that the daily papers, which gave considerable space to the melodramatic incidents of the trial, should not have given as much space to the final decision of the jury and the vindication of Dr. Smith.

ORIGINAL ARTICLES

"ACUTE CHOLECYSTITIS."*

By WM. WATT KERR, M. D., San Francisco.

In response to your request for some remarks about acute cholecystitis, I shall not attempt a description of the disease, but simply discuss some of the topics that come into the physician's mind when he is at the bedside with his patient.

Etiology: Nearly all cases of cholecystitis are due to the presence of micro-organisms. It is true that a traumatism may cause some inflammatory trouble, but this quickly subsides unless some microbe avails itself of the diminished resistance in the tissues to aggravate and prolong the disease; and it has been shown experimentally that toxines alone may cause irritation of the bladder wall, even haemorrhagic in character, but in a very short time the process becomes microbic so that practically all cases of cholecystitis are associated with the presence of micro-organisms.

The microbes most frequently found in the inflamed gall cyst are the typhoid bacillus, the colon bacillus, the pneumococcus, varieties of streptococci and staphylococci, and, just as in affections of other tissues, there may be mixed infections where two or more organisms are present.

At first we would be inclined to imagine that the most frequent route for the infection to travel was directly up the ducts from the intestines, but there are reasons why this should not be the case. (1) The duodenum is generally free from bacteria during health, a fact that explains to some extent why colon bacillus infection is not more frequent, although we must admit that this may not hold true in disease. (2) The periodical discharge of bile into the intestine flushes the ducts and offers a mechanical obstruction to the ingress of microbes. (3) The comparative powerful contraction of the sphincter of the diverticulum of Vater presents another obstacle.

Since specific micro-organisms have been found in the general circulation in typhoid fever, pneumonia and various other diseases, it appears perfectly possible that these agents may be carried to the gall bladder and give rise to trouble, indeed this opinion has the support of experimental evidence, but the more frequent route is the portal circulation in which bacteria that have escaped the destructive influence of the intestinal epithelium, leucocytes, and lymphnodes, penetrate the walls of the ducts or gall bladder that have already been damaged by the toxines of the disease. This injury to the tissue wall seems to be essential before bacilli within the gall bladder can cause any harm, because typhoid bacilli are almost constantly present in the gall bladder in fatal cases of typhoid fever, while cholecystitis is not a very frequent complication of this disease. In all probability the healthy mucous membrane lining the gall bladder is as resistant to bacilli, reaching it directly from the intestines, *via* the large bile ducts, as is the healthy bronchial mucous membrane to inhaled organisms, and it is only when the endothelium is injured by traumatism, biliary stagnation, or toxines and microbes attacking it from subendothelial tissues that the micro-organisms in the gall bladder can inflict any injury. This may explain why colon bacilli are frequently found in both healthy and diseased gall bladders, and why a cholecystitis due to the bacillus typhosus may not arise until ten or even twenty years have elapsed since the attack of typhoid fever.

The relation between cholecystitis and gall stones is a matter of considerable interest both from an etiological point of view and also in regard to treatment, because the symptoms of cholecystitis are not infrequently mistaken for those of cholelithiasis; surgeons have felt chagrined and patients have been rendered very indignant because an operation for the removal of gall stones has failed to discover any calculi. Gall stones are composed of cholesterin, calcium and bile pigment, alone or in combination with one another. At one time the view of Naunyn that the cholesterin in the calculi was obtained only from the endothelium lining the gall bladder was generally accepted, but this has been disproved by Bacmeister who has demonstrated that cholesterin is precipitated from the bile itself by chemical changes resulting from the action of the bacillus typhosus, the bacillus coli communis or other micro-organisms, and although endothelial particles from the gall bladder wall are not essential to the process, it is considerably hastened by their presence. This applies to pure cholesterin stones but not to those composed of lime and cholesterin, for in his opinion lime salts are an almost exclusive product of the secretory cells of the gall bladder. "As an amount greater than normal must be furnished to participate in the formation of gall stones, their presence signifies a catarrhal inflammation of the mucous membrane of the gall bladder." While therefore it is true that cholelithiasis maintains a mechanical irritation that permits the infection of the gall bladder and a consequent acute or subacute cholecystitis, it is nevertheless equally true that cholecystitis is responsible for the majority of cases of cholelithiasis with the result that the close relationship between the two often leads to symptoms being attributed to one condition which really belong to the other. There can be little doubt that the reputation enjoyed by many drugs in the treatment of gall stones is due to the fact that they relieve the cholecystitis but not that they dissolve the calculi.

An excellent example of this is in the following case of Mrs. D., age 38: I first saw her upon March 12, 1910. For many years she had suffered severe attacks of pain in the right hypochondrium and epigastrium which radiated downwards to both iliac regions but were most distressing on the left side. She had gone for months without any trouble, in fact she was perfectly free from pain during an interval of nearly six years, but it returned two years ago and gradually increased in severity so that instead of being present only for a few minutes, or at most two or three hours, it was now constant with occasional paroxysmal attacks, during which she was nauseated and could not retain food in the stomach. Her weight had fallen from 120 pounds to 87 pounds. The liver was large and tender, the gall bladder was distended below the umbilical line and very tender to pressure. Upon March 21st she was admitted to the Children's

*Read before the Yolo County Medical Society, Woodland, June 7, 1910.

Hospital, where, in addition to local applications, the medication consisted of two drachms of the Elixir of Succinate of Iron three times daily together with a capsule containing Euonymin gr. ss. and Extract Cascara Sagrad and Pil. Rhei Comp. aa gr. IISS every night. She improved rapidly and left the hospital at the end of three weeks when she was perfectly free from pain but still had tenderness on pressure over the gall bladder, and had gained six pounds in weight. Four weeks later she began to suffer again from severe paroxysmal pains, which came on at intervals for four days and during this time she passed more than forty gall stones. Upon May 31 she was much more comfortable but still had tenderness over the gall bladder, with pain in the bowels from gaseous distension. In this case we have an example of a drug that allayed the cholecystitis and the patient's suffering so that she believed herself cured but did not have any solvent effect on the calculi.

In this connection Bain's experimental work upon the treatment of cholelithiasis should be remembered. He has shown that when gall stones are placed in the healthy gall bladder of dogs they disappear in about six weeks, while if a culture of bacilli coli communis is injected into the gall bladder and at the same time its walls are scraped so as to produce an infectious cholecystitis the stones do not dissolve. This not only bears out what was said a few moments ago about the influence of cholecystitis in producing calculi, but as Bain remarks, it indicates that in the treatment of gall stones we should endeavor to render the gall bladder healthy rather than attempt to dissolve the stones in situ by giving solvents which act upon the stones outside the body.

Symptoms. It is not possible to differentiate with certainty between the catarrhal, suppurative and gangrenous forms of cholecystitis; as in appendicitis, we can only infer the existence of one or other from the intensity of the symptoms. The number of adhesions about the gall bladder that are found at surgical operations and at post mortem examinations warrant the suspicion that mild attacks of cholecystitis are by no means uncommon and that they are so evanescent as to be overlooked by the patient, or that we ourselves on account of the absence of colic, jaundice or distended gall cyst, have misinterpreted the symptoms presented by the patient.

In the majority of cases the temperature is but moderately, if at all, increased, in fact, variations in the pulse rate are of more prognostic value than is the presence or absence of fever.

Pain and tenderness are important symptoms but vary in their distribution so as to make errors in diagnosis easily possible. The pain may be of a steady, dull aching character, possibly when the serous covering of the gall bladder is affected, but more frequently it is paroxysmal in character, resembling that of gall stone colic. It is most frequently felt a little way above the umbilicus and to the right of the median line, but at other times it is in the epigastrium, the right iliac fossa or diffused over a considerable area of the abdomen, or it may be referred to the right shoulder or a point below the right scapula. Occasionally the tenderness can only be elicited by dipping the fingers below the margin of the liver and pressing upwards towards the gall bladder. Full inspiratory movements are suddenly arrested by the production of severe stabbing pain similar to that experienced in diaphragmatic pleurisy, so that the real nature of the attack is not infrequently overlooked and the patient is supposed to be suffering from the latter disease. We cannot see many of these cases without wondering what causes the pain and why it is so erratic in its characteristics.

It is generally conceded that, like the stomach and intestines, the gall bladder is not sensitive to ordinary painful stimuli, and it is questioned whether the painful sensations are ever really felt in the nerves of the viscus itself, or whether an abnormal stimulus in the viscus is transmitted to the cord and there diffuses to adjacent pain nerves so that the painful sensation is felt not in the viscus but in the cutaneous distribution of these secondarily stimulated nerves; or it may be that, since the normal distribution of nerves to the several parts of the body is in harmony with promoting the functional activity of that part and protecting it from injuries to which it may be exposed, there is no necessity for the viscera being endowed with sensibility to the same tactile and painful stimuli as the body surface since they depend upon the abdominal and thoracic walls for protection against external agents. Perhaps, however, it is possible that abnormal processes going on in the viscera may give rise to abnormal stimuli which are capable of producing pain in the viscera themselves. Although the existence of true visceral pain in response to special stimuli is still a matter of doubt, there cannot be any question that the sensation is diffused to adjacent nerves in the cord and gives rise to cutaneous pain and sensitiveness in the area of their distribution; hence we find the radiating character of the pain and the tender nodes upon the body surface.

We notice two kinds of pain in cholecystitis, the paroxysmal and the continuous, and both of these are due to increased tension. In acute cholecystitis there may be some swelling or other condition causing narrowing of the lumen of the bile duct; this will tend to produce accumulation of bile or inflammatory exudate in the gall bladder and a spasmodic contraction of its muscular wall in an attempt to expel it, similar to what takes place when feces accumulate in the intestine, hence the paroxysmal pain. The continuous pain on the other hand is due to the increased tension produced by infiltration of the gall bladder wall itself. The radiation of pain in many cases can only be explained by the presence of adhesions between the gall bladder and other organs. It is very common in cholecystitis to have pain in the region of the appendix and this may be due to a variety of causes. (1) There may be an associated appendicitis arising from a simultaneous infection, or, as has been suggested, the infecting micro-organisms in a cholecystitis may be derived from an inflamed appendix. (2) The gall bladder is sometimes so enlarged as to reach into the right iliac fossa and give rise to the appearance of a perityphlitic abscess. (3) There may be adhesions between the gall bladder and the peritoneal covering of the intestine giving rise to intestinal disturbance most acutely felt in the region of the ileocecal valve. The following case is fairly typical of the appendicial pain found in these cases. In

September, 1909, Mrs. W., aged fifty, consulted me regarding pain in the region of the transverse colon and gall bladder, and informed me that some years ago she passed several biliary calculi. The area of hepatic dullness was normal but there was marked circumscribed tenderness over the gall bladder. Cholecystitis and cholelithiasis were diagnosed. Under treatment the distressing symptoms disappeared and the patient regained her usual health. On May 13th, 1910, after considerable excitement and fatigue, she was attacked with headache, nausea and vomiting; pain and tenderness in the upper right abdominal quadrant with a maximum over the gall bladder, also diffuse pain and tenderness in the right iliac fossa, including McBurney's point, but the most intense tenderness was in the skin over the crest of the ilium. The fever disappeared in twenty-four hours and the pain was much mitigated. In six days the pain had entirely subsided, there was not any tenderness in the iliac region, but distress was severe whenever the gall bladder was palpated. Evidently this was an acute exacerbation of a chronic case of cholecystitis with local parietal peritonitis over the enlarged gall cyst, and the pain was transmitted downwards in the cutaneous nerves, as a result of the peritonitis, to the crest of the ileum and iliac region. The absence of special tenderness over McBurney's point made it improbable that the appendix was involved.

The following case is also of interest: A. J., age 42, a laborer, complained of fever and nausea together with severe pain in the right hypochondrium which was aggravated upon any attempt to take even a moderately full inspiration. No marked enlargement of the gall bladder could be detected but there was extreme tenderness on palpation over it. In a few days the acute symptoms disappeared, but more or less pain and tenderness persisted over the gall bladder and increased in severity whenever the stomach was distended by a full meal or when the patient bent over forward. As this condition did not improve after about four weeks the patient was referred to a surgeon with a diagnosis of cholecystitis and cholelithiasis and the suggestion that surgical exploration of the gall bladder was probably the best course to pursue. It was with some chagrin that a few days later a message was received from the surgeon to the effect that I had made an error in diagnosis and had mistaken a case of chronic appendicitis for diseased gall bladder; that he had removed the appendix after finding some adhesions as evidence of old inflammatory process, that he believed the gall bladder to be healthy because while the patient was still under the anesthetic, he had introduced his finger into the abdominal cavity through the incision in the iliac region and reaching upwards failed to discover that it was particularly enlarged or contained biliary calculi. The patient returned to me within one month of his operation still complaining of pain over the gall bladder but refusing further operation, and from time to time I saw him during the subsequent three years still suffering from his attacks of pain but without his appendix. In this case I blame myself that knowing the frequent co-existence of appendicitis and cholecystitis, I did not make a more thorough examination in the vicinity of the ileocecal valve to discover whether there were any signs of the appendix having been injured in former attacks, and thus have been in the position to prepare the patient for the possibility of a double operation, and I blame the surgeon that with the history and diagnosis given him he should have satisfied himself with such a crude examination.

The pain in the shoulder is probably due to the relationship between the phrenic nerve and a branch to the subclavius muscle.

It not infrequently happens that the patient suffering from cholecystitis cannot adopt certain positions without inducing pain and this is probably due to traction upon adhesions to the parietal peritoneum, or the pressure of other organs upon the diseased gall bladder. Thus when the patient lies upon his side there may be a dragging pain due to the weight of the liver making traction upon the adhesions and it is especially liable to occur where the abdominal walls are lax and do not give the normal support to the viscera.

The tenderness of the inflamed gall bladder to pressure is a prominent symptom and is somewhat difficult to explain when we are confronted with the fact that the healthy gall cyst is apparently insensitive to ordinary painful stimuli. Probably it is analogous to what was observed by Mackenzie in his well known case of bowel resection. He had to operate for the relief of umbilical hernia in a patient who refused to be anesthetized. After the abdominal cavity had been opened the rest of the operation was performed painlessly. Dr. Mackenzie says: "I was able to detach adhesions from the liver and bowel, to resect a piece of bowel and mesentery, and to stitch these structures without the patient experiencing the slightest sensation. But I found that he occasionally groaned with pain when I was not touching him, and watching to see the cause I found that the upper part of the resected bowel, which was laid on one side in a warm aseptic cloth, occasionally passed into peristalsis, contracting from a wide tube into a thick fleshy rod; when this happened the patient groaned with pain. I asked him where he felt the pain and he passed his hand invariably over the umbilical region. I started the peristalsis several times by slightly pinching the bowel, and each time the patient felt the pain. Here before my eyes was the cause of the pain, and the seat of origin of the pain was at least twelve inches away from the part in which the pain was felt." The argument is that pain in visceral disease is of a reflex character, the apparent impulse arising in the viscus and passing to the cord where, on account of its intensity or abnormal character, the stimulation extends to neighboring centers and from these, sends a sensory impulse to the brain, so that the resulting sensation is referred by the brain, not to the viscus, but to the peripheral distribution of the sensory nerve. This is described as a viscero-sensory reflex and its object in such cases as the present is to call into play such structures as Nature has interposed for the protection of the viscus and hence we find the abdominal muscles over the gall bladder thrown into a state of tonic contraction and constituting another symptom or sign found in diseases of the abdominal viscera.

It is not always possible to palpate the gall bladder because unless there is some degree of obstruction of the cystic duct, the distension may be comparatively slight. As a rule, however, the lining of the cystic duct is swollen so that the inflammatory exudate cannot pass through it and consequently the gall bladder may be felt as a pear shaped mass generally movable from side to side, but occasionally

fixed in position by peritoneal adhesions. A condition, however, may arise that not only makes it impossible to feel the enlarged gall cyst but has led to errors in diagnosis. I refer to paralysis of the intestine caused by extension of peritonitis from the gall bladder to the intestine. This may give rise to local distention of the intestine so that the gall bladder cannot be detected by the most careful palpation, or the distended loop of intestine may lie across the neck of the gall bladder and give rise to a tympanitic area between the head of the tumor and the margin of the liver, but the fact that it moves up and down with the respiratory movements should make us suspicious of its real character. When the paralysis affects the hepatic flexure of the colon, the bowel is liable to become obstructed and distended, but the extreme tenderness upon palpating over the right hypochondrium indicates to some extent the origin of the trouble.

It is not uncommon to find a prolongation downwards of the right lobe of the liver in patients suffering from cholecystitis and the formation of this Riedel's lobe, as it is frequently designated, is regarded by some as being secondary to the gall bladder disturbance. I have seen several instances of this formation but as there was no opportunity of discovering when the enlargement commenced and as they all ocurred in women, it has been a matter of doubt whether the two conditions were not produced by a common cause, such as the pressure of corsets rather than in the sequence of cause and effect to one another. The mere fact that the lobe grew smaller as the cholecystitis improved did not help to solve the question, as the treatment for each condition is almost identical.

Treatment: The medical treatment only applies to the catarrhal variety of cholecystitis. Rest in bed, and warm applications to the abdomen will be found of service in most cases. Occasionally it may be necessary to resort to the hypodermatic injection of morphin but from its tendency to cause constipation this should be avoided if possible and an attempt made to attain the same end by the use of poultices or compresses containing laudanum. The medicinal treatment demands that the bowels should be kept clear by means of mild laxatives, and remedies such as salicylate of soda, urotropin and methylene blue have been used on account of their supposed direct action on the gall bladder. My best results have been from the use of sodium glycocholate in five grain doses every night for three or four nights and repeated after an interval of five or six days, this intermittent administration being maintained for some weeks. At the same time dessertspoonful doses of an elixir of succinate of iron, equivalent to five grains of the succinate, were administered. This last remedy does not appear to have the recognition that it merits, possibly because it was vaunted as a cure for gall stones which is very doubtful, as in all probability it has not any direct effect upon the calculi, but in view of Bain's experiments, mentioned in an earlier part of this paper, which showed that calculi could be dissolved in healthy bile, it is possible that in some instances where the succinate of iron relieved the cystitis small biliary calculi may have been dissolved in the bile. I have knowledge of patients who more than twenty years ago were given this remedy on account of paroxysmal attacks of pain in the gall bladder, believed to be due to gall stones, and who have remained free from the attacks since that time. You may remember that in the case of Mrs. D., already mentioned, the patient was rapidly relieved from pain from which she had suffered continuously for months and subsequently passed a large number of gall stones; also that Mrs. H. experienced similar relief and was able to resume her duties within a very few days from the beginning of a severe attack; and the following additional case may be of service in further illustrating the therapeutic value of the remedy:

Case of Mrs. L. W., age 33. Consulted me on January 9, 1909, on account of pain in the right hypochondrium, which had been almost constant for the last eight months and was aggravated by coughing or deep inspiration. She could not lie upon her left side on account of this position producing a dragging pain in the right side. There was no enlargement of the liver nor of the gall bladder but pressure over the latter was painful. Her appendix was removed eighteen months ago. There was not any tenderness over the intercostal nerves, heart and lungs were normal, and the kidney was found in its normal position. The glyco-cholate of soda and the succinate of iron were administered as already described and on February 5, 1909, she reported as feeling perfectly well. I saw her in May, 1910, when she had a bilious attack but there was not any return of the gall bladder symptoms.

Many other cases could be brought forward but those already mentioned are sufficient to illustrate the beneficial results that frequently follow this line of treatment.

All cases of catarrhal cholecystitis do not yield to medical treatment, but many pass on to a chronic stage or rapidly become suppurative. In suppurative, phlegmonous or gangrenous cholecystitis there should not be any delay in adopting surgical methods, and even in cases which have become of a chronic catarrhal nature and cannot be relieved by medication, the question of operative measures should be considered just as in appendicitis, for there is always a strong possibility that calculi will form, and there is also the risk of recurrent acute attacks, any one of which may put the patient in jeopardy. Under such circumstances, the age, general condition of the patient, the severity and frequency of the exacerbations, their influence upon nutrition, must all have careful consideration and aid us in coming to a conclusion. It is not my province to discuss surgical technic, but I would only remind you that these operations can now be undertaken without the dangers consequent upon the use of ether or chloroform, by simply injecting into the abdominal wall in the vicinity of the proposed incision, a half per cent. solution of novocain to every twenty cubic centimeters of which one drop of a one in one thousand solution of adrenalin chlorid has been added. When injected in a proper way this produces perfect anaesthesia of the abdominal wall, and, as the viscera are insensible to ordinary painful stimuli, the gall bladder can be opened and drained without the patient experiencing any discomfort. This being the case there cannot be the excuses that formerly existed for advising delay.

SYSTEMIC GONORRHEAL INFECTION.*

By W. P. WILLARD, M. D., San Francisco.

The gonococcus may enter the blood, causing septicemia, and from the blood be deposited in favorable locations, producing inflammatory lesions. The literature on the subject shows that there is hardly a single organ in the body which may not become infected. Power reports a diffuse inflammation of the entire upper extremity due to a mixed infection by gonococci and staphylococci; Mazza a pleuritis, and so on from meningitis to an involvement of the skin on the sole of the foot. Why such entrance of the organism into the blood occurs in one case and not in another is hard to explain. A history of previous instrumentation in many of these cases suggests traumatic lesions of the mucosa as favoring general diffusion. Werthiem has demonstrated invasion of the veins with resulting thrombus, and Dreyer an involvement of the lymphatics.

Septic symptoms coming on in the presence of a gonorrheal urethritis should always be investigated, and it should be remembered that the amount of discharge is no factor. Often with the fever, sweats and depression of the systemic involvement, the discharge diminishes or may be absent. The primary focus may not be in the urethra, but in the prostate, vesicle or Cowper's glands. Systemic infections have been seen in infants with gonorrheal ophthalmia. In these cases a positive cultural test of the blood or joint fluid establishes a diagnosis, but unfortunately gonococci are very difficult to cultivate and a negative finding means nothing. I saw an analysis of a hundred cases in which only four gave a pure culture of the organism; in thirteen the culture was mixed and in eighty-three there was no growth. Although with improved technique we are getting better results in cultivating the gonococci, still a point has not been reached where we can absolutely rely on cultural tests. The blood picture does not differ from a septicemia caused by other organisms, showing as a rule a leucocytosis with an increase of the polymorphonuclear neutrophiles.

The fever associated with the primary disease is not an indication of systemic infection, but is probably due to the absorption of toxins. Often the symptoms suggest typhoid, which is at times difficult to exclude. Several observers have remarked the profuse sweats of gonorrheal septicemia. Thayer, in two of his cases, describes a diffuse eruption of reddish papules on the thorax and abdomen. The leucocytosis and absence of epistaxis and Widal are suggestive.

A case reported by Sherrer is of interest in this connection. A young soldier, who had been feeling out of sorts for a few days, entered the hospital with chills, headache and severe malaise. These symptoms in the next few days were accompanied by dyspnoea, diarrhea and increase of temperature. He gave a history of a slight urethral discharge for two weeks, but his symptoms were ascribed to typhoid. The serum test was repeatedly negative. His condition became rapidly worse, a soft murmur at the mitral area developed and his pulse became dicrotic. Six days after his entrance to the hospital there were further complications; the dyspnoea increased and mucous rales could be heard over both lungs. The following day a left pleural effusion developed, the fluid from which was rich in gonococci. He succumbed on the eighth day and post-mortem examination showed a gonococcic infection of the lungs, heart, pleura, peritoneum and urethra. The virulency of the infection in this case was not manifested before the systemic infection, as the urethral discharge had been very light.

Dieulafoy and others in cases that gave evidence of lung involvement have demonstrated gonococci in the sputum. Thayer demonstrated the organism in eight out of eleven cases of gonorrheal endocarditis. In arthritis gonococci can often be found in the joint fluid. The parts most often complicated in systemic gonorrhea are the heart and the joints.

Gonorrheal endocarditis is quite frequent and is a very serious complication. Some cases have been reported where the course was benign and the patient recovered with a crippled valve, but in most, the inflammation leads to proliferation and ulceration with the tendency to give rise to emboli. The left side of the heart is almost always affected and the aortic orifice is more frequently diseased than the mitral. A peculiarity of the heart sounds in these cases, as stated by several authors, is that they change very frequently in character and cannot be estimated with any degree of accuracy. Thayer reports cases in which the sounds during life suggested mitral involvement, yet at autopsy no lesions were found. Thomas had a case with marked vegetations on the mitral valves which gave no evidence on auscultation during life. Pericarditis has occurred and Councilman reported an acute gonorrheal myocarditis.

Articular involvements are the commonest of all and are disabling and serious complications. Many cases have been found in children with ophthalmia neonatorum. Males are more frequently affected than females and between the ages of twenty and thirty the most ceses occur.

Arthritis usually comes on during the acute urethritis, but may occur during the subacute or chronic stage. In Northrup's cases three or more joints were affected in 175 cases, one joint in 56 cases. Joints that are rarely affected by rheumatism are usually attacked, as the sterno-clavicular, intervertebral, temporo-maxillary and sacro-iliac. The

* Read at the joint meeting of the San Francisco Eye and Ear and the Urological Societies.

inflammation is often periarticular and extends along the sheaths of the tendons; more often the synovial membrane is affected. If fluid accumulates it rarely becomes purulent.

Osler describes several clinical forms.

(a) Arthralgic,—in which there are wandering pains about the joints.

(b) Polyarthritic,—in which several joints become swollen and tender.

(c) Acute gonorrheal arthritis,—in which a single articulation becomes suddenly involved, with severe pain and extensive edema.

(d) Chronic hydrarthrosis,—which is usually monarticular and very apt to involve the knee. It comes on without pain or swelling.

(e) Bursal and synovial form,—which attacks chiefly the tendons, the bursae and periosteum. The bursae of the patella, the olecranon and the tendo Achilles are most apt to be involved.

Gonorrheal exostoses of the os calcis usually occur between the ages of 18 and 30. Traumatism and occupation do not seem to be factors in their production. Some time after the urethral infection, usually from three to nine months, the patient complains of sharp, severe pains in one or both heels. The pain can be sharply localized in the center of the plantar surface of the heel and elicited only by weight bearing or direct pressure. The pain may incapacitate the patient. The gait is characteristic, the weight being borne by the ball of the foot with the heel raised. The os calcis is enlarged and thickened in most cases and the evidence of the radiogram establishes the diagnosis.

The liability of joint affections to recur as long as a focus of infection is present is illustrated by a case I now have under treatment.

Mr. A., age 32, traveling salesman. Always in perfect health until twelve years ago, when he contracted gonorrheal urethritis. This he treated by means of injections without much benefit for four weeks, then the left knee became involved. This was treated with salicylates, liniments, etc., and finally aspirated and was put in a cast. After being in the cast thirty days the pain became so intense on account of the reaccumulation of the fluid, that it had to be removed. After seven months of treatment he could again walk with a somewhat crippled joint. For four years he led a regular life and was free from trouble. Then after intercourse his discharge reappeared and with it an arthritis in the left hip, which lasted three months. Later on he noticed after intercourse a slight urethral secretion at times and has had the left knee, heel, cervical intervertebral and hip joints involved. One month ago he came to me complaining of stiffness in moving the jaw and a urethral discharge. On examination the secretion contained gonococci. A well-marked stricture of about 24 F. was found in the anterior urethra and the prostatic secretion contained many pus cells. He has developed arthritis of both tempora maxillary joints, as well as in the left knee and the metatarsal phalangeal joint of the great toe.

As all previous methods of treatment have been so unsatisfactory, we naturally turn to vaccine therapy as a panacea in these conditions. Although many good results have been obtained, still at times we are disappointed. Whether this is due to a worthless vaccine, a mixed infection or the attendant is often hard to determine. There is no doubt that autogenous vaccines are more effective than stock vaccines, but they are often impossible to obtain.

Drs. Eyre and Stewart, who have done a great deal of work with vaccines, claim that the doses generally used are too large and advocate the use of doses not to exceed 25 millions. In systemic infections a dose of 5 millions is given every five days. Where there is a joint involvement, in twelve to twenty-four hours after an injection, the affected joint becomes more painful and sometimes more swollen and red. These symptoms correspond to the negative phase. After 36 to 48 hours these symptoms clear up and the movements become much freer. A vaccine that can be used in large doses with no effect should be regarded with suspicion and the possibility of a mixed infection should not be overlooked. The use of hot air and passive hyperemia in joint conditions is an aid. The original focus should always receive attention.

ON THE RELIEF OF GLAUCOMA BY SUBCONJUNCTIVAL SODIUM CITRATE INJECTIONS.

By HAYWARD G. THOMAS, M. D., Oakland.

Pathologists and clinicians are agreed that glaucoma represents in essence a state in which the eye holds an increased amount of water. As we had best now regard it, it is in reality an edema, and the increased pressure brought about by this means accounts for all the clinical signs and symptoms observed in the condition. As generally held the increased amount of fluid contained in the eye in glaucoma is believed to be forced into the eye through such agencies as an increased influx or a diminished efflux of blood and lymph from the eye. The unsatisfactory nature of this idea is expressed in every text book of ophthalmology. Martin H. Fischer, in his work on edema, has given another interpretation of the phenomena observed. He maintains that the eye comes to hold an increased amount of water in glaucoma, not because more fluid is *forced* into the eye, but because changes take place within it which make it absorb more water than normal. He holds that the colloids determine the amount of water held by any tissue and defines glaucoma as a condition in which the normal affinity of the ocular colloids for water has been increased. This increase in the affinity of the colloids of the eye for water is brought about in either one or both of the following ways: First, through the production of acids within the eye; or second, through such changes in the colloids themselves as convert those having a low affinity for water into such as have a greater affinity. The necessary conditions for such an abnormal production of acids or such a change in the colloids of the eye are to be found in those illy grouped factors of arterio-sclerosis, syphilis, old age, primary inflammatory conditions, etc., that are generally looked upon as primarily responsible for glaucoma.

The clinical methods that we pursue in order to treat glaucoma divide themselves into the two groups of a systemic treatment which would combat an arterio-sclerosis, a syphilis, or what not, and a local treatment which in the aggregate is aimed at the mere reduction of tension within the eye. Upon this

local treatment especially great stress has of necessity at all times been laid, because of the disastrous results that follow the continuance of a high ocular tension for even a short period of time. Since Von Graefe's first writings on the subject iridectomy has been regarded as one of the best procedures to carry out in this condition. The years seem to indicate that this is not the ideal treatment for glaucoma. I may not be fortunate, but all the cases I have seen in my office or clinic, or in the county hospital, that have been operated on by various men are blind in the operated eye. Unless by accident a fistula into the subconjunctival space has persisted, an ordinary iridectomy does not seem to last long as a filtration project. In fact, an operation has recently been proposed for the purpose of producing such a permanent opening between the anterior chamber and the subconjunctival space. But making a leak hole in the anterior structure of the eye is a temporizing affair and at best a makeshift.

The fact that surgical procedures cannot always be carried out and that even when they can, iridectomies, sclerotomies, cyclodialyses, etc., do not give that permanent relief which is desired, has found expression in the more conservative methods of treating glaucoma that have been favored more recently. Hence the urging that we rely more assiduously on eserin, pilocarpin and dionin. But every ophthalmologist has all too often been confronted with glaucomas in which these means have proved entirely unavailing.

During the past year and half I have been using subconjunctival injections of sodium citrate to reduce the tension. Its use was suggested by the antagonism discovered to exist between the effect of acids and neutral salts on the imbibition of water by colloids. The method consists in the injection of from 5 to 15 drops of a 4.05% to a 5.41% solution of the chemically pure crystallized sodium citrate, preceded by the instillation of a cocain and an adrenalin solution into the conjunctival sac. During this time I have treated in all nine cases of primary glaucoma, and two of secondary glaucoma. All but one occurred in women. As a group the primary cases were in individuals over forty-five, and concerned thin, illy nourished women of sedentary habits. The effect of these injections in reducing tension was unfailing and without evil consequences. After each injection there was a relief of the symptoms of glaucoma for from three days to several weeks. The advantages of these subconjunctival sodium citrate injections over the other recognized surgical or medical procedures are evidently to be sought in their simplicity and in the promptness with which they produce results. Clearly these injections do not constitute a "cure" for glaucoma, but no more do iridectomies, sclerotomies, or any other procedures which merely aim to reduce tension. The cure for glaucoma clearly resides in the removal of those conditions which primarily led to the chemical changes within the eye which increased the affinity of the ocular colloids for water.

I would like to add a word regarding the cloudiness of the cornea observed in glaucoma. Fischer has found that this is not an edema, of the cornea, but represents a precipitation of certain of the protein elements of the cornea. The same seems to be true of such opacities of the lens as are typified, for example by the ordinary senile cataract. In using the sodium citrate injections for the treatment of glaucoma, I found that lenticular opacities cleared up remarkably. A number of the cases that I have treated in this way will form the nucleus of a paper on cataract absorption. Such a result was anticipated because precipitates of the protein are partially reversible.

Discussion.

Dr. Martin Fischer, Oakland: I have been much interested in the remarks made here this afternoon, especially in the attempts to produce experimental glaucoma in living animals through the injection of acids into the eye. Dr. Franklin got a distinct rise in tension sometimes, and sometimes his injections were without apparent effect. The matter is, I think, easily explained. In judging of the effects of such procedure two things must be borne in mind,—first, the direct effect of the acid upon the ocular colloids; second, the inflammation that may be induced by the acid, and the effects of the chemical changes characteristic of an inflammation in affecting the colloids. If one of these consists in the production of acids in the tissues, then the effect of this acid is clearly added to the effect of that which has been injected. One need not be surprised to see that the direct injection of acid into the eye is not always followed by a glaucoma. Under normal circumstances, what we might call the immunity of the tissues to acids is very high. If now the injected acid is not too strong, and not too large in amount, the circulation through the eye may very well be able to absorb it all so quickly that no glaucoma, or only a very slight temporary rise in tension may result. I would suggest that these acid injection experiments be repeated in conjunction with some procedure which makes a rapid absorption less easily possible, such for example as ligation of the arteries supplying the eye. How rapidly the body is able to take care of an injected acid is clearly evidenced by the artificial wheals (urticaria) which I showed can be produced by stabbing the skin with a hypodermic needle dipped in formic acid. The wheals so produced come and go very quickly. The question was raised as to whether a so-called primary glaucoma is any different from a secondary glaucoma. Pathologically there is, of course, no difference, for a glaucoma for which we know the cause, and a glaucoma for which we do not know the cause, are in essence the same. Glaucoma is only an edema of the eye-ball, and an edema is an edema no matter what the cause. The classification of glaucoma into primary and secondary glaucoma, and the former of these into simple glaucoma, inflammatory glaucoma, etc., has come to us from Fuchs' first treatise on the eye, and represents a clinical classification which tries not only to take cognizance of an etiology for glaucoma, but clinical appearance as well. This is of course arbitrary. The whole matter is similar to the manifestation of hernia, with which, as you know, glaucoma has been compared before this. If a knuckle of intestine should become twisted and develop a slight edema with various accompanying symptoms, and we did not know that the twist with a pinching of certain blood vessels lay at the bottom of the whole matter we would have what in the eye would be called a simple glaucoma. If the twist was more severe and the interference with the circulation greater, then the edema would be greater, the congestion greater, extravasations of the blood might occur, and various signs indicative of an inflammation. In the eye this would be called inflammatory glaucoma, yet there is no difference except in degree between the two pictures of the strangulated gut that have been here represented. Finally, if from any cause a very ap-

parent pathological change would set in in the knuckle of intestine under discussion, say an infection of the intestinal wall, and in consequence of the inflammation so produced, the gut should be found to swell (an inflammatory edema), then this would correspond with the picture of the secondary glaucoma. In other words, so far as the edema is concerned, which is the essence of glaucoma, it does not matter whether this is of unknown origin, or accompanied by particularly striking secondary manifestations, or the accompaniment of a frank pathological change, any more than it matters so far as the edema itself is concerned whether a man's legs are swelled from a heat lesion, or from a local erysipelas infection. I was much interested in the remarks about spontaneous glaucoma, and the fact that this occurs in rabbits. Anyone who has ever been interested in what rabbits are fed will know that great carelessness exists in the feeding of laboratory animals. Insteads of being given a good mixed diet, they are too often fed a so-called one-sided diet, one chiefly consisting of oats, or wheat or what not. Under these circumstances the animals develop an acidosis and a scurvy, and scurvy is characterized by the development of edema. Holst and Froelich, who have made extensive experiments on this subject, noted constantly marked edema in their scorbutic animals. William B. Wherry repeated some of these experiments about a year ago, and was kind enough to show me his results. In one of his rabbits he noted a marked glaucoma in both eyes.

Dr. Kaspar Pischel, San Francisco: After I had read Dr. Martin Fischer's interesting publications about his ingenious experiments. I became convinced that they meant a big step forward toward the solution of this puzzle. After consultation with Dr. Thomas, regarding strength and dosage, I immediately tried sodium citrate in every available case of glaucoma. I hope you all have tried it and will report your results. I made 10 injections in all; in 4 eyes with simple glaucoma I injected 0.1 to 0.2 of a 2½% solution without apparent result. But the patients complained so much about the pain that I could not try it again. In a case of glaucoma absolutum I made 4 injections 0.2 and 0.3 of a 2½ and 5% solution. Only the very first time after the smallest and weakest injection I noticed a slight reduction of tension. I am sorry that the results in my cases were not encouraging but I will try it again with larger doses.

Dr. Hayward G. Thomas, Oakland: In the 11 cases I have treated, I have given probably between three and four hundred injections, and have always observed prompt reduction of tension. One old man I saw for the first time 10 years ago. One eye was blind from glaucoma, inflamed and painful. He refused to have anything done for it. A short time ago he came with glaucoma of the other eye: T+2, vision 12/100. I immediately began injections and continued them weekly and bi-weekly. The reduction in tension was marked, and the vision in the good eye is now 20/40. As a matter of experiment, I injected the blind eye which has a cataract. The tension has come down very considerably, and the cataract shows a marked decrease in opacity. A patient from the country came into my office weekly for the injections. They were always followed by great reduction in tension, accompanying which the patient had a feeling of well-being. During these intervals she would feel happy, and be able to attend to her household duties. With return of the tension would return the depressed feeling. When I first used these sodium citrate injections, I had the old fear regarding the filtration angle, and so would use a drop of eserin to counteract any influence the cocain and adrenalin might have in dilating the pupil. I got over my fears when one day a nurse came to me and with horror told me she had by mistake used atropin in a glaucomatous eye. There was a mild panic in the office immediately, but I went ahead and used the sodium citrate; the tension came down immediately, and though there was dilatation and the usual cycoplegic effect for nearly a week, the tension did not rise and no ill results followed. In another case, that of a woman, thin, nervous, anxious, depressed, with both eyes glaucomatous and marked diminution of vision and field in one eye, I began injections, gradually increasing from 2% to 4% solution. This patient's sight and field became normal. Her general health improved greatly, as was evidenced by a gain of more than 10 pounds in a few months. The reason for Dr. Pischel's failure to get a reduction in tension is to be found in the fact that the solutions he injected were neither concentrated enough, nor sufficient in quantity. The ordinary case of glaucoma demands the injection of 10 to 15 drops of the 5% solution. The pain after such injections, while at times severe, does not last long, only 3 to 4 minutes as a rule.

Dr. Walter Scott Franklin, San Francisco: I agree with what Dr. Fischer has said in explanation of the rapid distribution of acid. It is necessary for us to find a method of keeping the eye in an acid media for a long time. Experiments seem to show that glaucoma is a stoppage of the filtration angle. Replying to Dr. Cohn, I did not inject bland oil in the eye; I prefer olive oil to the injection of ammonia, which is very irritating. Dr. Fischer's explanation of the rapid absorption of the acid certainly accounts for the fact of no hypertension being produced.

OPERATIVE TREATMENT OF FRACTURES OF THE NECK OF THE FEMUR.*

By S. J. HUNKIN, M. D., San Francisco.

Believing that the ordinary text-book teaching regarding the surgical treatment of fractures of the neck of the femur is bad, and believing also that results compared with those attained in other femoral fractures will follow better planned surgical treatment, is my excuse for this offering.

Orthopedic surgeons of late years have not been remiss in voicing opinions as to the advisability and efficiency of proper surgical procedures in such cases, but the ideas of the general surgeon ordinarily have prevailed, and they have taught that the surgical treatment of fractures of the femoral neck is in the vast majority of instances of no avail. Looking upon these fractures as pertaining to old age and fearing decubitus, delirium, pneumonia, and death, if confinement was insisted upon, and not believing union to occur under the best controlled conditions often enough to interfere with the rule, his opinion prevented any efficient action. The trusting patient then generally got little surgical attention and that little has usually been bad. The evidence of the last few years, however, and especially so since the common use of the Crookes' tube, has shown that fractures of the neck of the femur are not so rare in the young adult and are not unknown even in childhood. (Five instances of the latter have come under my personal observation.) Moreover, the "let alone" policy, or the little better policy of inefficient traction, combined or not with sand bags, or a padded bar, is not good surgery. May I here be permitted to state my conviction that in the large majority of recent fractures of the femoral neck in either the young or the old, repair, union and efficiency under ordinary careful surgical procedures, thoroughly carried out to the end, may generally be expected and secured. I believe also that proba-

* Read before the California Academy of Medicine.

bly the large majority of femoral-neck fractures under similar procedures will unite as frequently as would other femoral fractures in the same individual. That is—I believe the classical reasons urged for non-union, the anatomical peculiarities described as favoring non-union, are not usually so responsible for the fairly constant bad result, as the mechanical difficulties in the way of securing and maintaining constant apposition of the fragments over a sufficiently lengthy period. Ordinary axiomatic surgical treatment for fractured bones is here defined to be immobility of the fractured fragments in firm, constant apposition in proper alignment over sufficient time. This in addition to the care of the patient so that the ordinary equilibrium of the body shall be maintained, together with the prevention of decubitus.

Choice of Methods. In my opinion the plan usually pursued, of straight traction with plaster, pulley and weight, combined with a long outside splint padded like an effigy of a dromedary's back, bears about the same relation to modern surgery as a camel does to an automobile in modern transportation. It is mentioned only that it may be unqualifiedly condemned. It is about what we would do if we wanted a false joint to be the result. Maxwell's plan of traction applied in different lines has been efficient in a few hands, but it needs cumbersome, complicated apparatus and careful, repeated adjustment; again, it does not provide for immobility, and is open to all the objections consequent upon our maintaining an aged patient absolutely fixed on the back. Probably the best known and most widely followed efficient plan for impacted fractures of the femoral neck is that of Whitman, who first places his patient in the position for making the splint. After an anaesthetization in the above position the sound leg is abducted to the normal limit to control the pelvis, while the injured hip, under steady traction, is slowly abducted. The surgeon at the same time supports the joint and forces the trochanter downwards. Careful work during this procedure demonstrates the contact of the neck with the rim of the acetabulum. At this point, if the abduction does not equal that in the other leg, the abduction is gently forced until equal abduction is secured. The whole extremity is then fixed in a long plaster spica. In complete fractures the plan is slightly modified by first flexing the thigh to disengage folds of the capsule before the abduction is made; the surgeon, during the abduction, taking especial pains to lift the thigh upwards. This latter is the maneuver practiced many years before by Maxwell.

In impacted fractures this plan has been followed by me with success in several instances. In complete fractures of a few weeks' standing, however, I have several times tried this maneuver with the capsule wide open and the fractured ends in direct view, and while the end of the major fragment performed the evolution as Whitman describes, the head did not rotate that way and direct contact of the fractured surfaces was only obtained after various additional maneuvers. In old fractures this maneuver and position in every instance failed to secure contact under direct observation. I, therefore, fail to see how these movements would be more efficient out of sight than when I was looking at them. I have even seen contact secured in this position and, after a slight movement incident to human assistance, the head was seen to have slued from apposition.

Intra-osseous fixation adopted. Cheyne practiced pegging the fragments together with 3½-inch ivory pegs through the trochanter into the head. Nicolaysen used steel nails through the skin and trochanter without any incision. Wilson used coin-silver nails. Gillette, bone pegs and solid silver nails. Others have used screws, plates, staples, and whatnot, with varying success but mostly with satisfactory results in careful hands. Probably the character of the bone suture is of no particular importance, whether it be of coin-silver or of gilded steel. The bone by some operators has been noted hard and by others so soft that a nail or screw could be easily pushed in by the fingers, and even in the latter the peg has assisted in maintaining position.

Method of Operation. Usually an incision exposing the fracture, with a second small incision over the trochanter so as to enter and drive the nail in the direct line. Sometimes the fractured ends have been chiseled or curetted, and sometimes not, with no apparent difference in results. Gillette got one of his specimens 18 months later and found complete union. X-ray has demonstrated many others.

Incisions Used. Gillette's horseshoe incision, which is a convex downward incision from about 2 c.m. below the anterior superior spine across the trochanter 5 c.m. below the tip and division of the trochanter, is the hardest way down, yet apparently has been used most frequently with the so-called anterior incision going perpendicularly downwards from the anterior superior spine almost as frequent. Langenbeck's incision has been used successfully. Also a curved incision in front of the trochanter and a curved incision behind the trochanter. All have been successful, as was said about the suture, when used by careful hands.

Position of immobilization: generally in extension, combined with abduction, although Cheyne combined some flexion with his abduction. Whitman insists upon extreme abduction.

Technic of the Operation as Followed by the Author. Patient is on the back with each leg protected and wrapped separately. The assistant marks the line of the femoral artery just below Poupart's ligament. A crescent incision from nine to fifteen centimeters in length, depending upon the fatness of the patient, is swept from the anterior superior spine to within 1.5 c.m. of the femoral artery, curved back to about a perpendicular line from the anterior superior spine; this incision reaches the muscular layer. In fat subjects the incision divides a little of the rectus femoris and sartorius. In thinner subjects the muscle is not divided by reason of the incision being shorter. A few strokes of a dry dissector and the pulling inwards of the sartorius brings one at once upon the capsule of the hip joint. A little rotation of the leg, with a finger on the capsule, locates the anatomy and demonstrates the fracture. The cap-

sule is then opened with a knife and the fragments are exposed. A pair of deep retractors are introduced when direct observation of the fragments can be made. The internal fragment can be rotated with the hand or with a dry dissector and the cartilage of the head observed. The external fragment moves, of course, with the leg. The leg is then manipulated until the fractured ends are in contact and placed in that position, whatever it may be in which they appear less likely to slip. In recent fractures this is usually in the extreme abducted position of Whitman. One assistant is now given the sole duty to maintain this corrected position and the parts are fully exposed so that the assistant can see the anatomical landmarks of the pelvis. A tiny puncture with a bistoury is then made over the trochanter, about 4 to5 c.m. below the tip, into the bone and a steel (sometimes silver plated) nail 8 centimeters long is driven through the trochanter and neck into the head. When the small head of the nail approaches the skin a steel "set," cupped to fit the head of the nail, is applied to the head of the nail which is driven firmly home. It has always had to be driven, in my experience, in recent cases, although the different densities of the structures are evident as the nail moves along. Observation of the fracture line with the eye and finger fairly well determines the location and direction of the advancing nail. Wilson advises the nail to be barbed and theoretically that seems good; but lately I had directed the nail at a bad angle and it came through the neck a little inside the line of fracture, but not sufficiently inside to give sufficient hold in my opinion. The nail had been driven fairly well in and the point projected over one centimeter when it was discovered, and, well, if the nail had been barbed I would have been in a mess. As it was, a good ten minutes was not too long to get that nail driven out and replaced. After the nail is located I often drive one of my staples across the line of fracture, the inner arm going into the head just at the cartilage rim, and the outer arm into the neck to the outer side of the fracture. The capsule is then closed as tight as possible with firm catgut and the wound closed in the usual manner. A plaster of paris spica is then closely applied from toes to mammary line, during the setting of which firm pressure is made downwards and forwards from above and behind the trochanter. This pressure is sufficient to bulge the splint 2 c.m. deep and as big as the palm of hand. There is no fear of decubitus if this pressure is properly applied. In older fractures the procedure is modified for two reasons. First, there is an abundance of firm fibrous tissue around and between the fragments which has to be removed, and, second, the neck and outer portion of the head are not all there, and under these circumstances the extreme abducted position of Whitman throws your fragments wide apart; this has been true even after I have removed the trochanter down to the insection of the pyriformis. In some of these cases it has been necessary for me to divide even the pyriformis and pull aside, inwards, the tendon of the psoas iliacus and perhaps sacrifice most of my desired abduction before I could get contact. All abduction must not be sacrificed if we expect function later. In a situation in which contact could not be secured, and I appreciate that it is possible I should not hesitate to cut the inner surface of the trochanter to proper shape and try to unite it with the head.

All the fractures I have found have been intracapsular, some closer to the head than others, but all inside of the capsule and from the anatomy of the capsule which, in front, is attached to the intertrochanteric line, it is hardly possible, to my mind, even with an ax to produce an extra-capsular fracture. As to the circulation in comparatively recent fractures; the inner fragment appears to bleed normally, and in the old fractures, when a layer is cut off with a chisel, it seems to me to bleed just about the same as when I cut a layer off the end of an old un-united tibia. I don't think the circulation has so much to do with non-union as we have all along believed, nor is our failure in the inability to reduce the fragments, but rather it is to keep them there. The splint is the thing; the chief thing between us and union; between us and our failures. It is generally our bad mechanics, our inability to secure immobility, which gives us non-union. That the splint is the thing which makes or mars our success in bone surgery is the humble opinion of the speaker. The splint is made in such a manner as to permit of the patient being moved and turned as desired as soon as the splint has set—I have fashioned a wooden instrument to permit of the patient going into a side position, safely and comfortably.

Results. Practically every operator in the country who has done any comparatively good work, reports consistent good results. The speaker has done in the last four years 12 operations in the manner described and has had union in every one so far as he knows. Radiograms have not been made after the operation, so no absolute assurance can be given, but nine have recovered with good function and stability, and with less than 2 c.m. shortening. One, done some nine months ago, gets around easily with a cane, there being a weekly improvement. Two patients are still in bed, the operations being respectively four and three weeks old.

SOME FEATURES OF THE SQUIRREL PLAGUE PROBLEM.*

By GEORGE W. McCOY, Passed Assistant Surgeon, United States Public Health and Marine Hospital Service, San Francisco.

Plague among the ground squirrels is one of the most important problems which the sanitarian on the Pacific Coast is called upon to consider. The subject is so large that some of the more important features only will be considered in this paper.

History: The first positive knowledge we have of plague among ground squirrels in America was the finding of one of the infected rodents on a ranch near Concord, Contra Costa County, California, in August, 1908. Later in the same year several other

* Read before the Medical Society of the State of California on April 20, 1910, at Sacramento.

infected squirrels were found within a few miles of the first one. In the spring of 1909 an extensive investigation of the distribution of the disease was undertaken by the Public Health and Marine-Hospital Service co-operating with the State Board of Health. The investigation is still in progress.

The campaign has been under the direction of Surgeon Rupert Blue, of the Public Health and Marine-Hospital Service. The field work was entrusted to Passed Assistant Surgeon W. C. Rucker, while the laboratory investigations have been carried on by the writer.

Geographical Distribution: The geographical distribution of squirrel plague may be considered under three heads:

First: The area in which *the disease is known to exist* among the rodents. At the present time this includes six counties: Alameda, Contra Costa, Santa Clara, San Benito, Santa Cruz and San Luis Obispo. In Contra Costa and Alameda Counties the disease has been found in practically every locality in which it has been sought. In the other counties one or more foci are known to exist, but we are as yet unable to say how widespread the disease is in these counties, as it has been the policy to extend the work to new localities rather than to expend our efforts on those that are known to have the infection. It is possible that as the investigation proceeds we will find the infection in other parts of the State.

In the summer of 1908, a plague infected squirrel was found in a park in the city of Los Angeles. An extensive campaign carried on there, during which time several thousand squirrels were killed and examined, failed to show any other case of plague among the rodents, so that for our present purpose Los Angeles County need not be considered. The Los Angeles squirrel was found dead near the yards of the Southern Pacific Railroad, and it seems probable that it represented a small epizootic due to importation of the disease either by a rat or by a squirrel and not an extension of the epizootic which we now know is so prevalent in some parts of the State. One human case directly traceable to squirrel infection occurred in Los Angeles. Prompt measures of squirrel extermination were inaugurated by Dr. L. M. Powers, the health officer of Los Angeles, and these measures seem to have been effective in destroying the focus of infection.

Second: In addition to the counties known positively to be infected, there are several others, notably Merced, Tulare, Fresno, Stanislaus and San Joaquin, in which no cases of squirrel plague have been found, but in regard to which certain indirect evidence is available, pointing to present or past infection among the ground squirrels. In these counties a number of squirrels have been found which presented lesions not to be distinguished from those seen in ground squirrels that have recovered from plague infection.

Additional evidence in regard to these counties in which no cases of squirrel plague have been found is the following: Early in our work it was found that the squirrels in San Mateo County were almost uniformly susceptible to plague, while many of those in Contra Costa County were found to be quite resistant to the infection. The squirrels found in the two counties were of the same species and all conditions of the experiments were similar for squirrels from both counties. The sole difference was, that in the one instance (Contra Costa County) the rodents came from a county where large numbers of plague infected squirrels existed, while the others (from San Mateo County) came from a county where no squirrel plague had been observed and where investigation has failed to demonstrate the presence of the disease. Regarding these counties, Merced and others, we may say that they probably have had squirrel plague, but that it was not present at the time our examinations were made.

Third: As to the *possible limits of the infection* among the squirrels we are at present unable to make any definite statement. It seems not at all improbable that the infection might coincide in extent with the area of ground squirrel infestation, but we do not believe that it is so extensive as this.

In order that the members of the Society may understand the extent of our investigations the figures of our work up to and including April 9, 1910, are given here:

Squirrels examined	84,000
Squirrels infected	331
Number of counties investigated	21
Number of counties that have furnished infection	6

Natural Barriers: Let us now consider what physical features of the country may be expected to act as barriers to the spread of the epizootic we are considering. The first thing one thinks of is the presence of large bodies of water, and we find that the northern limit of the focus is defined, so far as we know at present, by the Straits of Carquinez and the Sacramento River. The question at once arises as to whether or not the ground squirrel can swim, and in answer to this we may state that we have found that these little animals have no difficulty in swimming. Whether they ever do actually cross large bodies of water is a different question, and one about which we have no information. It should be stated here that north of the bodies of water mentioned, we have a variety of the ground squirrels (*Citellus beecheyi douglassi*) which is slightly different from the ordinary ground squirrel (*Citellus beecheyi*). Whether the ordinary squirrel is also found north of the river we have not been able to determine.

The second natural barrier is high mountain ranges. The California ground squirrel is usually said not to exist in high mountains, though Passed Assistant Surgeon Rucker tells me that he has seen the rodents as high as 3500 feet on Mt. Diablo in Contra Costa County. This question is however of little importance, as all of the mountain ranges

are cut by passes and these are inhabited by squirrels; and in addition there is no very large range west of the Sierra Nevada Mountains. If the Sierras constitute the only barrier to squirrel plague the problem becomes infinitely larger than we now believe it to be.

The third factor to be considered here is the low-lying land that is flooded from time to time. There is a general agreement of opinion that very few squirrels, or none at all, are to be found in such land. However, this is not so distributed as to be of any aid in preventing the spread of the epizootic.

Among the natural barriers we must consider those wide stretches of country that support none of the higher forms of animal life. These barren areas would of course effectively limit the spread of the infection.

The danger of transportation of infected squirrels in commercial channels by common carriers, such as ships and trains, is so small that in my opinion it may be disregarded. When new localities are infected it is probable that it is by a peripheral spread of the disease among the rodents.

It seems likely that the density of squirrel population has much influence upon the prevalence of the disease. In parts of the country where squirrel colonies are few in number and widely separated, one would expect that the disease would have comparatively little chance to spread, the presumption being that opportunities for contact would be reduced to a minimum.

Nature of the Evidence of Squirrel Plague: I am sure that the members of the Society will want to know upon what grounds the diagnosis of plague among the squirrels in California has been made. As too much time would be required for a full discussion of this subject, I shall merely give you a summary of the evidence available.

Plague infected squirrels present certain gross anatomical changes that resemble somewhat the lesions of plague in other rodents and in man.

From these plague squirrels a bacillus has been isolated that corresponds in every way to the plague germs isolated in America and in other countries from plague rats and from cases of the disease in man.

The squirrel plague bacillus is influenced in the same way by anti-pest serum as are strains of the plague bacilli isolated elsewhere; in other words, anti-pest serum "protects" an animal against the disease-producing properties of the organism.

Finally, a number of cases of plague in man have occurred that have been accurately traced to squirrels. These were cases in which there was no other known source of infection.

I may state here that it is my personal opinion that we need have no apprehension of a great epidemic among people arising from the squirrel infection. Probably a few cases will occur every year while the infection remains among the rodents, but the direct influence upon mortality and morbidity figures will never be large.

The greatest danger of the situation is in the risk of the infection of rodents of cities, a subject which will be mentioned again, and in the gradual spread until the disease becomes so widely disseminated as to be beyond measures of control. Indeed, there are those who believe that the latter condition already exists.

Relation to Other Rodents: This is one of the most important features of the whole question.

It seems highly probable that the rats in any community might be infected with plague from contact with the fleas from infected squirrels in the vicinity or by eating the carcass of an infected squirrel, or possibly in some other way. Squirrel plague has been found very near to the cities of Berkeley and Oakland; so near, indeed, as to make this question one of great concern to us. It is believed that the infection of the rats of a city from the squirrels in the surrounding country does not often occur, but there are no theoretical or practical reasons that can be successfully urged against the possibility of its occurrence from time to time. It is my individual opinion, with which the majority of those, I think, who have studied the situation agree, that the menace to the cities of California from the presence of ground squirrel plague is far greater than is the danger of importation of the disease from abroad. So much for domestic rodents (rats). It is probably needless to say that measures have been taken to prevent if possible the infection of rats in the bay cities.

There is a very widely distributed class of rodents known as Brush Rats or Wood Rats. These animals are members of the *Genus Neotoma* and are closely related to the ordinary domestic rats and mice. These rodents are by no means rare on the Pacific slope. We have on record a single example of infection in a member of this genus. We do not know now whether this means that there is an epidemic among them or whether the one found was the result of accidental infection from ground squirrels. There are other rodents, various species of squirrels, field mice, marmots, etc., which while we have no knowledge of their relation to the infection are probably susceptible. It was pointed out by Dr. Blue long ago that geographical and zoological conditions on the Pacific slope are entirely consistent with the establishment of a permanent endemic focus of plague in the country.

Natural Subsidence of the Epizootic: The question has often been asked, as to whether the infection will not die out of its own accord. We have no experience in the way of previous epidemics of squirrel disease to guide us, but there is a certain amount of indirect collateral evidence available. We know that epidemics of various diseases among people tend to terminate spontaneously, and we have every reason for believing that in times past, epidemics of plague among rats have appeared, spread and finally subsided. This must have been the case in ancient times before anything definite was known about the relation of plague in man to that in rats; and in more modern times when pest has occurred in countries where systematic measures of rat extermination have not been carried out.

The question of a natural subsidence of the disease among the squirrels due to an attenuation of the germ is one that we have had in mind from the

start. The only experiment that seemed practicable was an attempt to artifically carry the infection through a long series of ground squirrels; that is, from one squirrel to the other. This was done by the process of inoculating each squirrel in the series from the spleen of the preceding one. In this manner, during a period of four or five months, the infection was carried through about thirty squirrels. There was no loss of virulence whatever, and the series was terminated only by the exhaustion of the supply of squirrels. The evidence all goes to point to the fact that the disease among the squirrels began six or seven years ago, and as it is still with us, it must have passed through a great many generations; far more than we have been able to carry it through in the laboratory.

When the epizootic sweeps over a squirrel country, it does not kill all of the rodents. Some have the disease and survive; others are probably naturally immune. We infer that this is the case because we now find a large percentage of resistant and even absolutely immune squirrels among those in counties such as Contra Costa and Alameda, where the disease, according to the best collateral evidence obtainable has prevailed for a number of years. Whether in due time the process of elimination of the unfit (the susceptible) and the survival of the fit (the immune) will go on to the complete extinction of the epizootic, we cannot say. Every year there is an enormous crop of young squirrels, and we are at least at liberty to hope that many of them have a hereditary immunity, and that in time the disease may extinguish itself. With our present knowledge of the subject, this gradual immunization seems much more likely than any attenuation of the bacillus.

Measures of Control: The subject of squirrel extermination or squirrel plague control will be dealt with very briefly.

It is not believed that it is practicable to actually eradicate the ground squirrels in such a large area as a county, much less in several counties. It is quite possible that a warfare against the rodents will so reduce their numbers as to make the natural dying out of the infection more probable.

Measures of control will naturally divide themselves into two classes: those taken by the individual property owner, and those undertaken by the municipal, state and federal authorities. As it is to the farmer's advantage to exterminate squirrels on his land, on account of the great damage done to crops, it is not anticipated that great difficulty will be encountered in getting the aid of the agricultural class, and the efforts made along that line thus far have been quite successful. The county and the State should be expected to aid in this work, and the latter has passed certain squirrel extermination laws which should be of great help in controlling the situation. Municipalities should guard themselves by putting a squirrel-free zone about them in order to prevent infection of their rats. The Federal Government should continue to exercise supervision over the measures taken.

Some idea as to the total cost of squirrel eradicative measures may be gleaned from the fact that in order to learn something on this point we have undertaken a campaign in the country immediately surrounding Berkeley and Oakland. It has been found that the average cost per acre for poison is fifty cents and for labor in applying the poison $2.00, making a total of $2.50. As the infected area covers more than one million acres we may get an idea as to the total cost of applying the measures of eradication. It is recognized that this figure is only approximate and that different conditions of terrain, number of squirrels in a locality, etc., make a great difference in the expense of various localities.

In conclusion, I may say that the presence of plague among the ground squirrels is not a cause for alarm or great apprehension. We must deal with the question vigorously and perhaps one of the most important factors is the dissemination by physicians of accurate information on the subject.

Discussion.

Dr. C. Rucker, San Francisco: This society is to be congratulated upon Dr. McCoy's presentation of this subject and I think that he has been too modest in that he has not laid enough emphasis upon the scientific work which he has done. My work has been entirely the field work, the administrative end, getting out and getting the squirrels and seeing to it that they arrive at the laboratory in good condition and then the final scientific work is begun. We have here a disease occupying a wide area of the country and the outlines of this area have not been determined in their entirety. It seems to me that it is the duty of every health officer and every physician to assist in this work by sending squirrels to the laboratory. It has been the custom, whenever any one makes known his desire to do this, to send him the proper containers in which to send the squirrels and to pay the expressage upon the package. These squirrels should be sent as fresh as possible and should be properly tagged to show when and where they were shot. It is not necessary that the squirrels should be exclusively furnished by shooting; poisoning will do just as well. It is well, as a matter of precaution, to put into the can a little chloroform to kill the fleas. The medical profession should be on the qui vive to determine the presence of this disease among human beings. During the last summer three cases occurred in the Alameda County jail, and in all these cases we were able to satisfy ourselves that these persons had been more or less connected with squirrels, and we should watch out for these things and try to find them. This is a new field of work; we know very little about it and we should be anxious to learn and to push it forward as rapidly as possible.

Dr. W. F. Snow, Sacramento: I would only emphasize what our president has said with regard to the work done in California. The State Board of Health was most fortunate to be able to turn this very serious problem over to the United States service for guidance and for 99 out of 100 parts of the work. This is really a national problem, and probably an international one. The state of California could not possibly have met it, and could not even now after our training with such men as were sent out here to us, handle it alone. I have had some letters which have disturbed me somewhat which are most important to you. They have come from the east from very reputable men, keenly interested in the welfare of this country. For example, some men of the faculty of Cornell, and others, have heard discussions of plague on the coast and have written letters asking for further information, saying that there is the greatest danger of plague spreading eastward through Texas by means of its transfer in squirrels, and thereon through the rest of the United States. These statements have come through slight exaggerations with reference to the squirrel problem. There is danger

if we fail to control the problem, but the active work being done warrants our statement that both ourselves and the United States are being protected. However, many people believe that we are not able to control it, and are suppressing the information with reference to the disease. That reflects upon us as citizens and upon the Federal service, which has done such valuable work for us. As physicians we should all see to it that we, as centers of scientific information, make these points clear to our fellow citizens, so that they may in turn make the points clear to their friends in the East.

Dr. L. M. Powers, Los Angeles: We have had some experience in Los Angeles County with the squirrel question. At first we were very much puzzled as to why these cases were appearing in that section, but upon investigating the country, we followed up the railroad to where it brought in and unloaded the freight cars, and have found that as these cars were brought down and switched off, they were cleaned and all the refuse swept out and the squirrels were attracted to that district. One of our cases was that of a young boy who, when trying to catch one of these squirrels, was bitten and five days later developed a high temperature and enlarged glands. We examined the case without knowing the nature of the disease, but finally became suspicious and went out and hunted up the squirrel which we found dead near the place where it had bitten the boy. This was examined and pronounced as plague and the diagnosis was verified by Dr. McCoy. We were much puzzled as to how the infection reached Los Angeles and how it could have skipped the country between Contra Costa County and Los Angeles, but we finally decided that its source was from the cars which had been swept out at that point, and that the squirrels had become infected and had then gone into the hills to live. We set out to destroy the squirrels and since then have had no more cases, either of human or squirrel plague. But the question comes up as to what to do next and where the cases originate, and whether it can be that it is started by co-mingling with rats. We have found that rats do not exist where squirrels are, but since the destruction of the squirrels, we have found that rats are becoming numerous.

Dr. R. G. Brodrick, San Francisco: I wish to congratulate Dr. McCoy upon the paper he has read and to lay emphasis on one point that has been overlooked on account of the shortness of time given for the reading of papers. That is the protection that cities might take against importation of the squirrel infected with plague. This matter was taken up in 1909 between Surgeon Blue and the Board of Health and an ordinance was passed making it prohibitive for any one to bring into the City and County of San Francisco squirrels from neighboring counties. The ordinance was directed chiefly against men and boys who on holidays and Sundays went into Contra Costa County to shoot squirrels for human consumption in the North Beach district of San Francisco. Dr. Rucker laid stress particularly upon the importance of this phase of the question, that is, of squirrels being infested with fleas which might spread the infection. Placards were put up in ferry boats, trains and hotels, written in Spanish, Portuguese, Italian and French, as well as English, and I believe that through the activities of the Harbor police this custom has been abolished.

Dr. Stanley P. Black, Pasadena: I think the health officer can help in this question, by endeavoring as far as possible to keep his district free from squirrels. It is a big work and in Pasadena I have kept up the fight each year. The man whom I have employed to poison the squirrels has reported to me that the city is practically free from squirrels except in the outlying districts, where the holes which have been emptied of squirrels, are later occupied by squirrels which emigrate across the city limits. We will soon eradicate the squirrel from the state of California if we keep on with this work.

ARTIFICIAL CULTIVATION OF THE LEPRA BACILLUS IN HAWAII.

By HARRY E. ALDERSON, M. D., San Francisco.

The writer, on his last visit in Honolulu (July, 1910), had the privilege of seeing living cultures of the lepra bacillus (in the tenth subculture) at the Kalihi Receiving Station laboratories. For some months Brinckerhoff, Currie and Holman (all of the U. S. P. H. and M. H. Service) have been endeavoring to confirm Clegg's work and after having inoculated hundreds of tubes with leprous material, finally succeeded in growing the organism so that they were able to transplant it and carry it on to the tenth subculture. They have been able to greatly improve on Clegg's technic and have learned many new details which seem to be essential to success. They have successfully grown the bacillus four times from three cases of leprosy and have finally isolated it in pure culture. This was accomplished by first growing the organism in symbiosis with the cholera spirillum and the ameba (the latter obtained from the intestine of a guinea pig). The improved technic will be fully described in an article soon to be published by Donald Currie.

There were many interesting observations made during the course of this work, some of which are as follows: Success was met with only when the material was obtained from rather early untreated cases. Failures resulted when inoculations were made from late cases, or early cases that had been given Chaulmoogra oil for some time. This point will be worked out more fully by Currie. It was found that the serum from recently deposited non-ulcerated nodules offered the best chance for success. The formula of the medium used was as follows: Salt 0.3, Agar 20.0, Water 1000.00, cleared with egg albumen. For growing the ameba, beef extract (0.3) was added to this formula. The ameba and the cholera organisms were first grown separately (the former as already indicated and the latter on glycerin-agar). Then the leprous material, cholera and ameba cultures were planted on a Petrie dish (after the manner to be described in detail in Currie's article), and after a certain stage had been reached this mixed culture was transferred to tubes. Lack of space will not permit a full account of the details here. It was found that the cholera spirillum became quite virulent when grown in this way. Bacillus coli, and bacillus typhi murium were tried as substitutes for the cholera organism, but without success. The culture tubes must have an abundance of water of condensation and it is best not to disturb them any more than necessary. Clegg recommended examination of the tubes on about the tenth day for the purpose of determining whether multiplication had occurred. Brinckerhoff, Currie and Holman did this in the early part of their work, but they soon concluded that the failures were largely due to disturbing the tubes. Now they do not examine a culture during the first three weeks of its growth. After transplanting the mixed culture three or four times, it is subjected to a temperature of 60° C. for three minutes. This kills off the amebae and the cholera organisms, but does not affect the lepra bacilli, which latter can then be transplanted and readily grown in pure culture.

Multiplication of the lepra bacillus is indicated by a change in its morphology. In the young cultures it appears as a short, plump, acid-fast organism occurring in chains ("an acid-fast strepto-cocco-bacillus"—Currie). Later it tends to return to the form seen in tissue. Variations from these forms occur, however.

All of this work has been well controlled throughout and some very interesting results of animal inoculations will be published soon.

The laboratories at the Kalihi Receiving Station (Honolulu) and at Molokai are completely equipped and there is a great abundance of material available. At the former place the government is building new hospitals for experimental treatment. Arrangements have been made for animal experimentation on a large scale and interesting results are to be looked for in the near future. The preparation of an emulsion of the lepra bacilli for "vaccine treatment" will be the next step in this great work, and some of those so fortunate as to be engaged in it have expressed the opinion that in a few years "we shall be as far advanced in the successful treatment of leprosy as we are now in the care of tuberculosis."

A CASE OF HERNIA IN A CHILD.

By THOMAS GARFIELD DODDS, M. D., Oakland.

Name, Harry K., age 4 years. Well developed and well nourished; full term child; bottle fed. Mother states that child was "born ruptured." Since birth has had attacks of inability to retain urine. Child exceedingly cross and irritable at all times. At times attacks of vomiting and febrile temperature were noted. At such times child complained of severe abdominal pain. Family physician examined child and referred parents to an instrument maker who applied a spring truss. Mother states that truss has always seemed to hurt the child. Since first wearing truss, which was begun at the age of two years, child has been periodically afflicted with spasms. Complained at intervals of a great deal of pain in scrotum and right inguinal region.

Examined 6/25/10. Physically an apparently normal child except noted absence of right testicle. Oblique inguinal hernia present. Marked sense of resistance noted in lower right quadrant of abdomen. Pressure over McBurneys' appendiceal point showed slight tenderness. About one inch lower down a decidedly tender point was found.

Diagnosis—Undescended right testicle. Oblique inguinal hernia on right side, and probably a condition of chronic catarrhal appendicitis. Operation advised.

Date of operation, 7/2/10. Oblique incision on right side down to sac. Sac opened. In sac appendix found coiled upon itself and adherent to walls of sac. When uncoiled appendix measured 5 2-3 inches in length. Appendix removed through opening in neck of sac. Fine silk purse string method used. Undescended testicle found in sac just above appendix. Impossible to draw testicle down into scrotum. Testicle about 1/3 size of left testicle. Removal of testicle. Typical Bassini operation completed on R. side.

Post-operative History.—Appendix opened after removal; found to be catarrhal in type. Child left hospital in two weeks. Has since gained in weight; has become less cross and irritable; has had no recurrence of spasms or pain, and no further incontinence of urine.

Conclusions.—All cases presenting themselves wherein an absence of the testicle is noted along with a condition of hernia, are not well adapted to the wearing of a truss. It is always advisable that the physician himself should fit the truss, should the advisability of wearing such be determined upon. It is unwise to cause the pressure of a truss to be brought to bear upon a testicle that may be caught in the inguinal canal.

In two and one-tenth per cent. of all children who are born ruptured, the appendix will be found in the sac. A ruptured child having a history of repeated attacks of spasms may in reality be suffering from repeated attacks of appendicitis.

ACUTE LYMPHATIC LEUKEMIA: REPORT OF A CASE.

By JOS. M. KING, M. D., Los Angeles.

The following case occurring in the practice of Dr. C. A. Jenks is deemed worthy of report on account of the very high leukocyte count, high percentage of leukocytes in a lymphatic case, the size of the lymphocytes, and the autopsy findings.

H. N., aged 20, single, born in Connecticut of Norwegian parentage, electrician by occupation, called a physician on July 16th, complaining of weakness, fever, and tenderness in the splenic region.

He had two brothers and three sisters, all living and in excellent health, as were also his father and mother, and his maternal grandparents. His paternal grandparents lived to old age. He lived in Connecticut until four, when the family moved to Los Angeles, where he had since resided. Until fifteen he had attended school, then for two years worked in a rubber stamp factory, and the last three years of his life he did inside electrical wiring. He did not drink or smoke, led a temperate life, and gave no history of venereal infection. Of the diseases of childhood he had measles, mumps, and chickenpox, and at ten was confined to bed for a week and to the house for three weeks with what was said to be "typhoid pneumonia." He was fond of athletics, and did gymnasium work three times a week, but had no recollection of having received a fall or blow in the splenic region or elsewhere. He had not had malaria. In the latter part of April this patient noticed that he had slight digestive disturbances, with some weakness, vertigo, free perspiration, and on inquiry recalled that he also had slight pain in the splenic region. No fever or splenic enlargement were noticed by him, and he did not stop work or seek medical advice. This condition continued with intermissions until July 9th when, while at work in a neighboring town, he developed a slight nasal and bronchial "cold," with gastro-intestinal symptoms reappearing and increasing in intensity, so that he took to his bed, complaining of abdominal cramps, constipation, headache and fever. On July 13th he returned home, and for the next three days spent part of the time in bed and part about the house, depending on the severity of the gastro-intestinal symptoms. On July 16th a physician was called, who noted the enlarged spleen but made no diagnosis. He put the patient to bed on a restricted diet, and administered quinin and salin laxatives, resulting in copious dark stools, probably hemorrhagic.

On July 19th the young man came under the observation of Dr. Jenks and myself, at which time he was in bed complaining of a little frontal headache but no other pain, slight blurring of vision, hearing impaired, and of great weakness, although he was going some distance to the toilet. He also had some cough with the expectoration of scanty sputum mucoid in character, occasionally slightly blood tinged, and which on subsequent examination did not contain tubercle bacilli. He was drinking considerable water, perspiring very freely, and felt hungry and asked for a more liberal diet.

Examination revealed a well developed young man 5 ft. 9 in. tall, weighing about 140 lbs. The tongue was heavily coated, but no leukemic infiltrations were noted in the mouth or throat. With the exception of a few mucous rales heard in the left infra clavicular region, no abnormality of the lungs was found. The

respirations were increased in frequency and some dyspnea was noted. Dullness was present over the upper part of the sternum, continuous with the cardiac dullness below. No tenderness was noted over the sternum or the shafts of the long bones on percussion. The apex beat was observed in the fourth interspace, two inches within the nipple line. The area of cardiac dullness seemed normal in extent, although the heart was pushed to the right. No murmurs were heard on auscultation. There was slight general abdominal distension, and the superficial abdominal veins from Poupert's ligament upward were full and congested. Upon palpation the spleen was found to extend to the median line, reaching down to the level of the umbilicus; slight pain was elicited by pressure on the splenic tumor. In the right hypochrondrium a somewhat illdefined mass could be demonstrated reaching about to the umbilicus; its edge did not appear sharp, and it was not tender to pressure; it was dull on percussion, being continuous with the dullness in the hepatic area. The submaxillary, cervical, axillary and inguinal glands were uniformly slightly enlarged, but not tender. The patient had not noticed them. The epitrochlear glands were not enlarged. The temperature was 101.8 F., the pulse 104, soft, compressible, but of good volume. Respiration 30.

Blood: Hemoglobin (Dare) 42%, reds 3,024,000, whites 1,128,000, color index 0.7, ratio of whites to reds more than 1 to 3.

The stained specimen showed moderate poikilocytosis and anisocytosis. There was slight polychromatophilia. As the case advanced nucleated reds, both normoblasts and megaloblasts were found fairly common, the megaloblasts exhibiting all degrees of polychromatophilia, an occasional one being seen which seemed to be absolutely basophilic. In the nuclei of the megaloblasts the various stages of mitosis were seen, and in one it was very evident that division of the nucleus had taken place.

A differential count of the whites gave

		per cm.
Mononuclear nongranular	98.5%	1,111,080
Polymorphonuclear	1.0%	11,280
Eosinophiles	0.3%	3,384
Basophiles	0.2%	2,256
Myeolocytes	0.0	0
	100.0%	1,128,000

It seemed impossible to differentiate the mononuclear nongranular cells into large and small lymphocytes and large mononuclears, for while by far the greater percentage were large lymphocytes, there was every gradation from the smallest to the largest, and although an occasional large cell had a smaller nucleus with a relatively larger ring of protoplasm, these also seemed to shade into the large lmyphocytes.

Some of these large cells measured 24 m, and many of them were 22 m in diameter. In the nuclei of these large cells a reticular network was apparent. Neither Lowit's bodies nor Auer's rods were observed.

Urine: Clear, straw-colored, acid in reaction, sp. gr. 1022, no albumen, sugar or casts.

On each succeeding day the patient grew worse, with increasing shortness of breath, discomfort after eating, fullness in the epigastrium, and a very nervous, almost hysterical condition at times. He began to have some pain when he lay on his left side, and during the night of July 21st suffered from a rather severe nasal hemorrhage, which was repeated on the night of the 24th. During all this time his appetite was good, and remained so until two or three days before his death. On July 26th enlargement of the right epitrochlear gland was observed, and on the 27th a copious petechial eruption appeared on the abdomen and lower part of the chest, gradually extending to the limbs. The spleen continued to enlarge; the patient gradually sank into a comatose condition, and died on July 30th, three months after the first symptoms, and eighteen days after he was first confined to the house.

An autopsy was performed by Dr. Stanley P. Black, who gave the following report: The body is that of a fairly well nourished young man, apparently about twenty years of age, five ft. nine in. tall, weighing about 140 lbs. A bluish green discoloration exists above both inguinal regions. Petechial hemorrhages are present in the skin. Upon removal of the sternum a mass of tissue is found filling up the anterior mediastinum, adherent to the pericardium and sternum. The left pleura contains one pint of dark amber colored serum, without fibrin. The upper lobe of the left lung is emphysematous; the lingual lobe is markedly emphysematous, and the lower lobe consolidated and airless except in the upper portion. Nodules the size of a bean, firm of texture, are seen on the surface. The consolidated area is not granular on the cut surface, and contains a large amount of bloody fluid; the small nodules when bisected show a fairly circumscribed area, bulging from the cut surface, the central portion dark, about black, with a pigmented grayish colored outer zone. The right pleura contains no fluid; the diaphragmatic surface of the pleura is ribbed with dark red granular flat masses irregularly distributed. The right lung is voluminous, emphysematous at the margins, the upper lobe containing air, the lower part of the lower lobe dark red and airless. The cut surface projects irregularly above the level of the surface, is somewhat granular and exudes a dark red fluid. Over the anterior surface and the posterior surface inferiorly of the pericardium there are large thick very firm masses, markedly nodular, extending up over the base of the heart and the beginning of the great vessels, about three inches thick and filling the anterior mediastinum, which, when cut through, show red granular masses resembling adenoid tissue. Upon opening the pericardium a large amount of cloudy serum escapes. The inner surface of the pericardium presents numerous small ecchymotic patches. The heart is normal in size and appearance. The left ventricle is empty with the exception of a very small goose fat clot. In the left auricle there is a large dark clot, grayish in color on its dependent surface. In the right ventricle is a large goose fat clot. The valves and myocardium are normal. The intima of the aorta presents small lines, slightly prominent, of a marked yellow color. The thyroid appears normal in all respects. The upper border of the liver is at the lower edge of the fifth rib, and the lower border at the level of the umbilicus. It extends from the umbilicus diagonally to the seventh costal cartilage of the left side. The lobulation at the falciform ligament is about three inches in depth. Over the anterior surface at the margin of the ribs there is marked glassiness of the capsule. The color of the left lobe is yellowish, of the right lobe normal. The markings are very plain and distinct. Its consistency is normal. The right inferior projection is markedly movable on pressure from the back. The gall bladder is large, and fairly well filled with bile, its walls being thin and lax. A clear dark amber colored bile is easily squeezed out from the ducts. The lining is smooth and of normal texture. The spleen projects to within a half inch of the level of the anterior superior spinous process, and is nine inches in length, six and a half inches in width, and four inches thick There are no adhesions to its surface. In the upper three-fourths it is of the usual color, the lower pole showing light pink patches from one-half to one inch wide, one to three inches in breadth, irregular in shape, pinkish in color, and not projecting above the surface. Throughout the lower pole we find dark and tortuous lines, which resemble vessels. On section the organ is of a uniform dark red color, with no bluish tinge; the pulp projects slightly above the capsule; on scraping with the knife a small amount of a bright red fairly clear fluid is obtained; the scraped surface has a markedly glistening appearance. The pancreas appears normal.

The suprarenal on the right side is small, rather darker in color than normal, on section the cortex is not prominent, but the medulla shows the normal brown pigmentation. The left suprarenal is normal. The kidneys are equal in size, their consistency slightly decreased, the surface slightly bluish in color, with round areas of a dark red color under the capsule; these patches do not project above the surface; cutting through these patches we find a wedge-shaped hemorrhagic area extending down into the cortex; the pelvis of the kidney is dark mottled red; the cortex is of normal width, the whole cut surface, both cortex and pyramids, of a pinkish color; the capsule strips normally.

The bladder is full of amber colored urine, its walls are normal, and the prostate is not enlarged.

Throughout the ilium the solitary follicles are enlarged to about pinhead size and, with Peyer's patches, are prominent; in the ascending colon there are masses of apparently adenoid tissue, dark red in color, ulcerated on the surface; the base of the ulcers appear smooth, and are of the same color as the surrounding tissue.

The mesenteric lymph glands are much enlarged, being from the size of a split pea to one and three-quarters inch; they are of a light yellowish color throughout; the lymphatics in the lesser omentum are much enlarged, some being one by one and a half by one and a quarter inches; the cervical, right epitrochlear, mediastinal and inguinal lymphatic glands are similarly enlarged and affected.

The sternal bone marrow is a dull red color with innumerable spots of apparently connective tissue or blood vessels, with pinpoint to pinhead sized whitish spots; the bone marrow of the left femur is of a dark red color, semi-transparent in appearance throughout the shaft of the bone; the vessels are seen as connective tissue streaks.

Anatomical diagnosis—Acute lymphatic leukemia; emphysema of lungs; hyperplasia of spleen, liver, and of cervical, right epitrochlear, mediastinal, mesenteric, retroperitoneal and inguinal glands, and of bone marrow, and lymphoid deposits in kidneys, ileum, anterior mediastinum, and elsewhere throughout the body.

RAILWAY SURGEONS

NON-UNION OF FRACTURE.*

By A. W. MORTON, M. D., San Francisco.

The subject which I have selected is one of so much importance that I believe a discussion by this body of Railroad Surgeons will be of much benefit.

This can not be overestimated when we consider that the railroads of this country produce more fractures than all other corporations combined. We must also consider the legal aspect, and the amount of dissatisfaction which it causes to the surgeon and the patient, to say nothing of the anxiety of the friends and the ever present claim agent. I believe we will all agree that it does not receive the attention it merits.

Every surgeon will sooner or later meet one of these perplexing problems where the patient will not be willing to go to the hospital where he can receive more radical treatment, so long as he is not suffering any special pain, and the claim agent has not settled. Such cases often last long periods of time; the attending surgeon condemning himself for the result, the patient and his friends are often of the same opinion, and do not hesitate to say so.

With our improved methods of diagnosis and treatment, we should seldom get this condition if we give the patient the proper treatment in the beginning. We should skiagraph the fracture just before and after the primary treatment to see that the bones are placed in the proper relations and that they remain thoroughly immobilized.

You may claim this is impossible, but I want to say that the time is near when the public will demand better results in the treatment of fractures and will not be satisfied with the indemnity received from the railroads, but they will appeal to the courts, who will require better results in this neglected branch of surgery.

If you have failed to take the skiagraph before this condition arises, do you think you have been able to administer the proper preventive treatment? These are questions we should consider well; the jury may do it later.

Non-union is referred to a fracture where all effort on the cells of the part have ceased to perform bony union. This condition varies, according to the location of the bone fractured, and we seldom speak of non-union until several months of delay causes us to anticipate that nature has exhausted her efforts in repair. This condition is generally attributed to constitutional and local causes. Any of the constitutional diseases which lower the vitality of the patient may be a predisposing cause, and should always be noticed.

The great factor is found in the local condition of the fracture which has not been relieved at the first dressing; defective treatment. The ends of the bones are not placed in approximation; they may be separated by muscles, tendons, intervening fragments of bones, or muscular action, all of which have a tendency to separate the pericostal bridge. Suppuration and necrosis often act as a factor.

The local treatment is divided into the non-operative and the operative. It is well to assume that the treatment has been at fault, and that the non-union is generally a result of imperfect apposition of the fractured bones and imperfect immobilization.

The parts should be placed in apposition and thoroughly immobilized, and kept in that position for several weeks, which will often correct the defect. Should this fail, some of the local methods should be tried to stimulate the formation of callus.

The Bier method of producing venous congestion locally is produced by applying a rubber bandage just above the fracture snug enough to cause the parts to become slightly swollen, and not to pro-

* Read at the Eighth Annual Meeting of the Pacific Association of Railway Surgeons, San Francisco, August, 1910.

duce any unpleasant feelings. This should be an adjunct to the other treatment and applied for a few hours night and morning. This will seldom fail to relieve the condition of delayed union, and assist in the cure of non-unions.

Bier has also suggested the injection of twenty to thirty c.c. of blood from the patient between the ends of the fracture. The ends of the bones may be stimulated by applying counter-irritation over the seat of fracture by percussing the parts with a hammer, so as to produce a local congestion. Forcibly rubbing the ends of the bones together has many advocates. Some irritate the ends of the bones by drilling into them. Injecting irritants such as tincture of iodin between the ends of the bones is used with some success.

The most practical method is to expose ends of the bones, resect them so that you have the parts as nearly like a fresh fracture as possible. The bones are retained in position by means of sutures, staples, pins, or better, strong metallic plates such as are recommended by Arbuthnot Lane. There is a tendency for the muscles to contract and produce much tension, which may cause a loosening of the screws or a fracture of the plate. Should this be in the leg, by severing the tendo-Achillis, the parts will be retained much easier. One of the most difficult fractures I have found to hold is in the upper third of the thigh, where the upper fragment has a tendency to be tilted outward and forward as a result of the gluteus maximus. In such a case the lower part of the attachment of the muscle should be severed.

The plates are united to the bones by screws. The wound should be closed with the most extreme care. If there is any branch of surgery that requires more perfect technic than any other, it is in this class of work. The parts should be supported by plaster or some form of splint.

Should there be much loss of bone in the arm or leg, the space may be filled by using the accompanying bone and permitting one end to retain its vascular attachment. If the space should be next the upper end of the tibia, the patella may be utilized to procure union.

In 1901 I performed the first case of non-union by transplanting of bone from the lower animals to man, by retaining its vascular attachment.

The case was one of the osteomyelitis of the lower end of the tibia, where it was necessary to remove about five inches of bone. The fore-leg of a small dog, after being prepared, was amputated just above the tarsus, leaving the radius one inch longer than the ulna. The skin and muscles were separated from the dog's leg for five inches. The radius extending into the cavity of the tibia, the ulna along the side of the tibia, which was retained in position by wiring. The skin was closed to near the lower end of the wound, the dog's bone passing out at the lower angle. The large tendons of each leg were severed and each limb closed in plaster-of-Paris. Then the entire dog, except his head and genital organs and the leg of the man, were enclosed in paster-of-Paris. Five weeks later the cast was removed and the bones sawed and placed in contact with the astragalus. Union was firm after a few months and the bone gradually filled in the same size as the tibis. The case was reported in the transactions of the California State Society in 1902, and American Medicine, July 12, 1902.

DISEASES AND INJURIES TO KNEE JOINT AND TREATMENT OF SAME.*

By ETHAN H. SMITH, M. D., San Francisco.

First, let me express my approbation of the term used by Robert Jones, of Liverpool, England, for this class of cases, that of derangement of the knee joint. Of all the major articulations of the human anatomy, none is more exposed to disease and injury than the knee joint. The more we know concerning afflictions of the knee joint, the more complex the matter becomes. We formerly designated these conditions under two heads—tubercular and non-tubercular. To the surgeon having wide experience in these cases, even with the help of the X-ray, this designation becomes inadequate. It is not always possible to say whether a knee joint is tubercular or non-tubercular. Many knee joints becoming deranged, because of an external injury and non-tubercular for an indefinite period, after such injury, become tubercular in time. We must frequently reserve our diagnosis as to the exact condition until we have had the case under observation for some length of time. As to the conditions which we may find in a deranged knee joint, they may comprise one of the following list of diseases. Synovitis with effusion; tubercular arthritis involving both the synovial membrane and the articular cartilage, or the cartilagenous structures of the joint with little involvment of the synovial structures. We may have a joint deranged by what may prove to be an arthritis deformans, in which many other articulations will be involved; we may have a loose piece of cartilage, as a result of an injury, which acts as a foreign body and in which there is no serious inflammatory condition present, but which, if neglected, frequently becomes tubercular; we may have a serious derangement of the knee joint, due to injury to the semi lunar cartileges, which, if treated, appropriately, will pursue a non-tubercular course, but which, if neglected, frequently undergoes tubercular infection; we may also have a derangement of the knee joint due to constant slight daily trauma, or to the peculiar occupation of the individual, which latter case is frequently not properly diagnosed, or appreciated, in its true light, because the conditions which cause the same are considered to be of not sufficient consequence to produce disease. We may frequently have a gouty condition, aggravated by occupation or injury, resulting in serious derangement of the knee joint. Experience has taught us that frequently the beginning of a serious derangement is a slightly bruised spot. In this bruised spot capillary stasis occurs. If the tubercular bacillus effect a lodgment in such spot, it is the ideal soil for the production of a colony. The cases of tuberculosis of the knee joint arising without memorable history of a serious injury, or perhaps, any injury at all, arise from the

* Read at the Eighth Annual Meeting of the Pacific Association of Railway Surgeons, San Francisco, August, 1910.

lodgment of tubercle bacillus within some part of the joint. How long it may take for such infection to manifest itself after having taken place must ever be left to speculation.

A condition which sometimes occurs, without any possible history of trauma, injury from occupation, or other exciting causes, is synovitis with effusion, due to infection from the micro-coccus lanceolatus, of "Frankel." One such case I wish to quote:

A previously healthy, young woman, married, mother of a large healthy infant, her husband particularly strong and healthy, no suspicion of tubercular disease or gonorrhea in either man or wife, had an effusion into the synovial sac of the right knee joint; no pain or inconvenience, until the synovial sac became greatly distended; no history of injury; the patient had never suffered from rheumatism; had never suffered from any condition referable to any joint in her whole anatomy; had always lead a most reputable life; not addicted to the use of alcoholic beverages or drugs; had never been seriously ill in her life; had never been exposed to any unusual hardship or engaged in any occupation bringing undue strain or irritation upon her knees, or any other articulation in her anatomy. For two weeks she sought no medical advice; then the effusion was withdrawn, plaster of paris dressing was applied, and the patient put to bed. Within forty-eight hours an enormous effusion had taken place in the left knee joint, apparently without provocation. No rise in temperature; no pain, except from pressure after the synoval sac had become greatly distended. Under strictest aseptic precaution, the effusion was withdrawn with an aspirator, and the fluid cultured. On blood serum a pure culture was obtained, of micrococcus lanceolatus. No other organism was demonstrated, nor did the culture become contaminated for many days in the laboratory; no demonstrable morbid process developed in the articular cartileges, in either joint. Both joints recovered with perfect function, and remained well for fifteen months, when the same condition in a much less aggravated degree recurred in the left knee joint. Cultures were made on blood serum, agar and bullion. Due to a defective incubator, no results were obtained, but with the withdrawal of the fluid, application of plaster of paris dressing, the patient recovered within two weeks, and for several months has suffered no inconvenience.

A gouty condition, aggravated by constant irritation, as a peculiar daily occupation, may bring about serious derangement of the knee joint. Many are dubbed gouty, rheumatic, etc. The real diagnosis of such conditions is seriously befogged. An individual, who may be the subject of gout, and who has an occupation which brings particular stress on the knee joint, may suffer serious derangement of that joint, frequently resulting in the destruction or one or both of the semilunar cartilages. In these diseases of the semilunar cartilage, we find an outgrowth of bony prominences at the margin of the articular cartilage, where it merges into the bony part of the epiphysis. One such case I have in mind. A man, about thirty-six years of age, who had been many years addicted to the use of alcoholic beverages, consuming large quantities of beer daily, and whose occupation was that of repairing gas tanks, for illuminating gas, carried underneath railroad passenger coaches. In his work he was obliged to kneel almost constantly, and in making hurried repairs, frequently did so without any pad under his knees, kneeling on the hard gravel or plank surface between the tracks. Both knee joints showed a margin of articular cartilage studded with a row of bony, bead-like prominences. One knee became seriously inflamed and painful. This knee he had bruised in such a manner as to loosen the anterior portion of the internal semilunar cartilage. The joint became so painful that he was obliged to enter a hospital. The indications were such as to make the removal of the internal semilunar cartilage a necessity—this will be referred to later.

Treatment.—The treatment of derangement of the knee joint must depend upon the careful diagnosis of the existing condition. Whether the joint should be opened or treated more conservatively, must depend upon the conditions present. One of the principal conditions which will decide as to the operative treatment of the joint, is locking in any degree of flexion. Any knee joint which becomes locked so as to compel the patient to take some time and particular exertion to fully extend the knee, is a positive indication for opening the joint. It means that some structural part of the joint either of the semilunar cartilages, or bone or calcified fatty tag, commonly known as a joint mouse, is acting as a foreign body in the joint, and is a source of irritation and unending trouble until removed. In the case above referred to where the patient's occupation had been that of a repairer of gas tanks, the internal semilunar cartilage was found to be not only loose, shifting in and out, frequently in such a manner as to cause locking of the joint, but shriveled, and dark brown in color, hard and having lost all semblance to its normal condition. This was removed, the joint placed in plaster of paris, and the man advised to seek another occupation. After several months, he returned to his occupation, not knowing what else to do, and has suffered no further trouble with his knee. Joints of this kind are prone to become tubercular, but where this does not occur, after an extended length of time, gross changes take place in the contour of one or both condyles of the femur. Because of the semi-flexed position in which the patient walks, the cancelus structure of the condyles is re-arranged and the former convexity of the part bearing the articular cartilage may become flattened and altered in shape. In connection with this condition, we may consider the operation known as arthroplasty. This sounds well for the instant and while seeming plausible, it is an unnecessary prolongation of a necessary operation without any compensation. Fascia, or other soft structure, pulled into a joint, can never be made to take the place of any cartilaginous structure. It will atrophy within a few weeks, and the result is no better and many times less satisfactory than the simple removal of the offending structure, and careful closing of the joint.

In opening the knee joint, it is practically never necessary to divide the patella, the quadriceps tendon, or any other important structure, which might interfere with the function of the joint. The straight incision about one-half inch internal to the inner margin of the patella, of sufficient length to expose the condyle of the femur and the synovial sac, above the patella, is all that is necessary. By this incision, no important structures are divided, the joint may be thoroughly explored, any offending

loose body removed, the joint closed and speedy recovery take place.

Catgut should not be used in closing the capsule of the joint. The structures are so thin, and ligamentous in character that absorption does not readily take place, and no matter how carefully and properly the catgut may have been prepared, it easily becomes infected from the skin, many days after the wound has apparently healed without infection. The figure of eight silkworm gut suture may be used, the loop of the suture closing the capsule of the joint, and the two ends of the suture closing the skin and fascia, and removed within a few days, leaving no foreign substance in the tissues. One thing that must be strictly observed in any of the above operations on the joint is the prevention of hemorrhage into the joint during the operation. Blood, even in small quantities, permitted to remain in the joint is one of the most potent causes of infection. All bleeding points should be carefully secured, before opening the capsule of the joint, and great care taken in all necessary manipulations so as to prevent, so far as possible, oozing of blood into the joint cavity, and in case blood oozes into the joint cavity it must be carefully and absolutely removed. If there has been no damage or injury to the articular cartilage of the joint, after being carefully closed, it may be put up in plaster of paris, extending from the ankle to the gluteal fold between the hip and thigh. Plaster of paris dressing of less length is useless. If the articular cartilage has been damaged, or injured, extension must be made with weight and pulley, or some form of extension splint, the joint being slightly flexed to relieve tension on the insertion of the hamstring tendons. Without extension or traction, as some surgeons prefer to call it, in the event of damage or injury to the articular structures, the pain is intolerable and is effectually relieved by extension.

One indication for the opening of a joint which is sometimes given undue prominence, is the detection of grating. Grating due to exposed bone, undergoing carious disease, is a late symptom of a badly disorganized joint, and means irreparable damage. It means that the function of a joint cannot be restored and is the result of serious infection. This sign is of no particular value, as the general condition is apparent. The more powerful flexor tendons within a very short time produce sub-luxation of the head of the tibia. With the Sayre's knee extension appliance, properly adjusted, extension is made on the joint relieving the pain and sub-luxation is reduced, and by the strapping of the joint as done by the late Dr. Sayre, the swelling and induration rapidly disappear, and the joint makes good recovery. A mixed infection producing pus in the joint, due to infection from pyogenic organisms, which results in acute abscess, absolutely prohibiting the application of plaster of paris or any ambulatory apparatus, rapidly destroying the structures of the joint, calls for immediate operative interference, rest in bed, extension with the weight and pulley and drainage. Some special cases may be so acute as to call for amputation above the knee as a life-saving measure. These latter cases are exceedingly rare, and the condition is so acute as to admit of no doubt as to the proper procedure. This alternative is mentioned, as a rare exception. Nearly all cases of tubercular disease of the knee joint involving the cartilages make extension imperative. After all inflammatory symptoms have subsided and there is no pain or pressure over the epiphyseal line of the femur, the semi-lunar cartilages, or the coronary ligament, the extension may be removed, and a convalescent dressing of plaster of paris from the ankle to the gluteal fold may be substituted and the patient permitted to gradually bear weight on the limb. After some weeks, the plaster of paris dressing may be removed, and the patient allowed to walk with crutches, gradually moving the joint and bearing weight upon it without support or dressing.

The limbering up process of a knee joint that has pursued a favorable course, is the most critical part of the treatment. To know when it is safe to remove all dressings, and to begin the restoration of the function of the joint is a very nice distinction in surgery.

I have not mentioned the matter of diet and personal habits in the handling of these cases, because it is presumed that all competent surgeons are familiar with such matters.

I have not mentioned the treatment of these conditions by the X-ray, as has sometimes been applied, actual cautery, blisters, painting with iodin, hot fomentations, etc., etc. Nor have I mentioned the treatment by Bier's passive congestion, and application of the hot air or baking process, which latter leads to inflammatory thickening of the synovial membrane, and most other soft structures about the joint, a condition which favors a chronic course of the original disease, and delays or prohibits recovery. Blisters and hot fomentations, and other empyrical methods are useless and should have been obsolete many years ago. Bier's method has nothing to recommend it, and does not even relieve the pain, is positively without merit, permits the disease itself to produce irreparable damage, through loss of timely, proper mechanical treatment. It causes useless atrophy of the muscular structure and is rapidly becoming obsolete in these cases, and must eventually be forgotten. I do not wish to have you understand that I desire to arraign that most eminent surgeon, Dr. Bier. He has contributed much of great value to surgery, but Dr. Bier's method applied to derangements of the knee joint and especially those of an acute nature is wholly without merit and the sooner we recognize this fact the better for our patients.

To sum up: These cases yield immediately to proper mechanical treatment. Treated empyrically, tinkered at by one indifferent method after another, they rapidly go to the bad. The exact condition must be diagnosed and first of all, appropriate mechanical treatment instituted. By this means both pain and inflammation subside and recovery begins immediately.

PROCEEDINGS OF THE SAN FRANCISCO COUNTY MEDICAL SOCIETY.

Section on Medicine.

January 3, 1911.

The Present Status of Cancer Investigation.

By PHILIP KING BROWN, M. D., San Francisco.

I am presenting this review of the subject, which is wholly abstracted from current literature on the subject, in the absence of Dr. Gilman, who is detained at home by illness.

Etiology. Injury and chronic inflammation seem to bear an almost constant relation to cancer. Not crushing injuries or single severe injuries, which are more likely to be followed by sarcoma, but repeated slight injury or irritation. Examples of this are shown in smokers' lip cancer; X-ray cancer of the hands in people constantly exposed to the rays; X-ray cancer developing from lupus after X-ray aplications; tar and asphalt workers' cancer, referred to by Oliver; chimney sweeps' cancer of scrotum (Oliver, Butlin), 29 of the 32 cases in one London Hospital being in sweeps; bladder cancer in analine workers (Leyberth); gallbladder cancer in 70 per cent. of cases associated with gall stones, and nearly 3 to 1 more common in women, just as gall stones are; epithelioma in carbon workers (Leuke); cancer in sailors following dermatitis from exposure (Unna); cancer of neck from rope injury, among natives of the Philippines who carry heavy burdens supported by rope around the head and neck (Gilman); Bilharzia carcinoma; cancer of the abdominal wall from the use by natives of India of small earthernware stoves held next to the abdomen; breast cancer in women, particularly after chronic mastitis (Leaf); pyloric cancer on ulcer base (McCarty and the Mayo brothers, Moynihan and others); uterus cancer, more common after cervical injury and inflammation (Cullen); betel leaves cancer of inner side of cheek in persons chewing the leaves, always on side where stuff is stored in the mouth.

Of negative value, is absence of cancer of penis in Jews and Mohammedans, both of whom practice circumcision, and therefore chronic balinitis the common etiological factor is rare. In 100 cases of cancer of the penis in the Massachusetts General Hospital, not one in a Jew, and Bashford has never seen it in a Mohammedan.

There are three interesting ideas regarding the growth of cancers that are worth mentioning, since there is argument to support each one.

1st. Substances exist under extreme or unusual conditions of the body that stimulate cell proliferations. (Spuda, Loeb, Fischer, Starling).

2nd. Substances normally present in the body affording protection vs. unusual cell proliferation may be absent temporarily or permanently (Beard, Leyden and Bergall).

3rd. Cancer cells have a greater proliferative quality because they have a greater attraction to nutritive material (Albrecht and Erlich).

In regard to the first hypothesis Conheim's views form the basis. He argues that tumors arise from cells "that in the course of development have been displaced from their normal relationship, or have failed to undergo a normal atrophy." He is able to show such groups of cells in both infant and adult bodies, and calls them "embryonal rests." They have been found very commonly by some observers, and the natural question arises as to why some and not others of these "rests" are awakened into proliferative activity, and under what conditions are they so awakened.

Cancer cells as such do not exist; they are merely ordinary epithelial cells possessed of a dynamic force which either causes them to grow unusually when normal epithelium does not grow in the same way, or causes them to be influenced by nutritive conditions in a way that normal cells are not influenced. Pathologists have shown us many facts that are interesting in this connection. First, the normal fertilized ovum in the human being, if lodged elsewhere than in the uterus, is a parasite growing at the expense of its host, invading the tissue of the fallopian tube, for example, just like a cancer, until finally it eats its way through, and the too often fatal results follow. Second, Gibbons has shown chronically inflammed glands in Hodgkin's disease actually invading the walls of blood vessels, that is, breaking through basement membrane and invading the tissues of the host like cancers. Third, Loeb found that injuring the uterine wall in pregnant guinea pigs, led to proliferation of decidual tissue at the point of injury. This does not occur if the corpora lutea is removed before injury. Fourth, Starling found that virgin rabbits injected subcutaneously with rabbit embryo emulsion show an hypertrophy of the mammary glands, and rabbits that have borne young show lactation in addition to this.

The second hypothesis, that there is frequently absent from the body substance which when present serve a protective function, and that in this absence cell proliferation may result under favoring excitation, has also some facts to support it, for example the altered nutrition of a part frequently injured or irritated. The possible neutralization of substances needed for protection vs. invasion of cells by products of decomposition resulting from injury as in cancer of the breast or by chemical substances causing the irritation, as in cancer of the stomach. The use of normally protecting cells for other purposes because of the irritated conditions of the part in question. It is hard to explain the complete absence of digestive fluid from the stomach in the presence of some cancers involving very small areas. Beard's use of trypsin and amylopsin in the treatment of cancer is along this line of reasoning.

Erlich's idea, the basis of the third hypothesis, of a greater affinity of cancer cells over normal for nutritive substances, brings us back to the question of the dynamics that makes one epithelial cell normal and the other a part of a cancer.

Immunity Experiments. Immunizing against cancer in animals, especially mice, has brought up a close study of the relation of cytolysis and of anaphylaxis to this end. It has been shown that an animal sensitized to one organ of another species develops in his blood a substance which when injected into an animal of the species from which the organ was taken, will cause necrotic changes in that organ. An example of this is seen in Beebe and Rogers' serum for exophthalmic goitre. Any foreign proteid, when injected into a living animal, sensitizes that animal to that particular proteid, so that a second injection of enough of the same proteid, harmless as the initial injection may have been, may cause the death of the animal. Vaughn, Pierce and Anderson and others have shown the extent to which this may be carried and it is now well understood that cytolytic sera is specific for the animal species furnishing the cells and not necessarily for any special type of cell from the animal. About this fact there is, however, still some doubt.

Erlich's studies led him to believe that the artificial immunity to tumors in lower animals was not blasto-specific, but Bashford showed definitely that it was the epithelial covering of the embryo alone which produced immunity in mice against epithelial tumors. Von Dungern described a specific epitheliolysin in the serum of rabbits previously injected with ciliated epithelium from the trachea of the cow, and suggested the possibility of developing sera for different epithelial cells. This, however, has thus far been unsuccessful, and attempts to produce a specific antiserum for cancer have been unsuccessful.

Among the more recent investigations upon immunity to tumors, those of von Dungern and Coca, "Zeitschrift fur Immunitatsforschung und experimentelle Therapie. Vol. 11, 24 Mar., 1909, p. 391," are perhaps the most significant in their bearing upon the problem of immunization against cancer in human beings.

Von Dungern excised a young, rapidly growing, moderately malignant sarcoma, which had been derived originally from a wild hare, and had been transplanted to the laboratory rabbit, and inoculated with it two groups of rabbits. Group A consisted of normal, i. e., hitherto unused animals, group B had been previously inoculated with an emulsion of an identical tumor derived from another transplant. Among the second group were animals in which the tumor resulting from the first inoculation was still present as well as animals in which the resulting growth had been excised, or had been spontaneously absorbed, and also animals in which the first inoculation had failed altogether. Although every individual of group A developed large tumors, in not one animal of group B was the second inoculation successful. Furthermore, the tumors still present in some of the members of group B, which were derived from primary inoculation, softened after the second injection of tumor material, and were converted into sterile abscesses.

There is considerable question as to what is the exact explanation for the disappearance of the sarcoma in von Dungern and Coca's original experiments published in 1909. Whether there be a protective function exercised by basement membrane, or a definite cytotoxin produced in the blood, is a matter of controversy. In the one case, the disappearance of the tumor would be practically by starvation, the body being fortified against this parasitic action of the tumor. The other hypothesis supposes a selective and specific cytotoxin with destructive power for cancer epithelium and not for normal epithelium.

Imperial Cancer Research Fund Report.—Notes. Lancet, July 23, 1910, page 265.—Emphasis placed on the immediate influence of irritation. Experimental sarcoma produced "from what have been the non-malignant connective tissues of carcinoma." Occurrence is rare and has been noted in only two strains of transplantable carcinoma, one strain showed the change in only a small number of animals and was only completed after several repeated transplantations. In the other the transformation was more frequent and rapid, and occurred at times in one transference. Transplantations of spontaneous tumors in the same animal are almost invariably successful, but in other animals of the same species they frequently fail whether the inoculated animals are young or old, healthy or cancerous. For illustration, in 55 re-inoculations of cancerous animals with their own tumors 54 were positive; 77 inoculations of spontaneous tumors in other spontaneously affected mice only 5 were positive. (American observers have met generally with a larger percentage of successes). Bashford's experiments would seem to show that the cancer cell was much more dangerous to the host than to other individuals.

Young animals furnish more suitable soil than older ones, and it is definitely shown in propagating tumors that the general biological properties show a relative constancy, but occasionally there are changes difficult to account for. "All cancerous mice do not exhibit an equally suitable soil for tumors in general. Spontaneous variations of the parenchyma cells of tumors during propagation suggest that we have a repetition, in a minor degree, of the cellular processes responsible for the primary transformation of non-cancerous into cancerous tissue. Just as cellular changes occurring during propagation may transform a slow-growing tumor into one rapidly proliferating, so in the tissues prior to cancerous growth the responsive proliferation of cells may pass into the progressive, independent proliferation of cancer."

Successful vaccination against cancer does not prevent the development of spontaneous cancer.

Methods successful in preventing or retarding the growth of transplantable tumors have been without effect in the growth of spontaneous tumors.

Thirty-four strains were examined for spirochetes with negative results. Reference is made to the fact that they have been found in mice without tumors.

Regarding immunization Bashford claims that resistance can be induced only by employment of living tissue. No success has been obtained by him through disintegration of cancer cells of providing for the continuance of the powers of inducing resistance and at the same time destroying its power of growth.

Bashford records the failure of the experiment in 25 spontaneous tumors to prevent recurrence or dissemination or prevent successful re-inoculation of spontaneously affected animals with their own tumors.

Notes from the Philippine Journal of Science, January, 1910.—Von Dungern and Gorowitz experiments show the development of hyper-sensitiveness to cancer proteids in the patient with cancer. There is an increased reaction from subcutaneous inoculation with extract from the patient's own tumor, whereas in healthy individuals no reaction occurred, nor was there any increased reaction in the patients injected with extracts from the tumors of others. It has been repeatedly shown that the organism can be sensitized against its own tissues even to the point of destroying them, and these experiments of Gorowitz would seem to indicate that a cancer case may be sensitized against its own tumor.

Immunization in human beings.—Von Leyden and F. Blumenthal (Deut. Med. Woch., 1902, 28-36), attempted to produce active immunity in a cancer patient against his own cancer, by injecting into the patient some of the tumor tissue of which he was the host. In three instances they regarded that they had averted metastases and caused reduction in the size of affected glands.

Von Dungern and Ranzi have conducted similar experiments with cancer patients; Ranzi using carbolized extracts of their own tumor tissue.

Vaughn has reported a number of cases treated with small amounts of tumor material injected every three or four days, without proving anything further than a possible influencing of the original growth. He discusses the question from the point of view of a possible sensitization of the patient against his own tumor by injection into him of material from a similar tumor in another case, pointing out that a round-celled sarcoma was favorably influenced when used on another patient where it had failed as an autogenous vaccine.

Gay (Boston, Med. & Sug. Jr., Aug. 28, '09) from animal experiment showed that during what he termed the premetastatic period, the resistance of the individual could be increased by reinoculation of the tumor or products of it, to such an extent as to cause resorption of the original tumor. Gay further points out in the Harvard Cancer Commission lecture of 1909 that this premetastatic period lasted about 35 days. If the second implantation was made after this period, both it and the first implantation continued to grow. These experiments were controlled and corresponded to the findings of Bridre, Gaylord and especially Stricker.

Tyzzer, Harvard C. C. Lectures, 1909, p. 6.—After filtration of an emulsion of tumor tissue through ordinary filter paper, the inoculation of the filtrate has been attended (in animals) with negative results. If the tissue of inoculable tumors is kept at room temperature on its removal from the body, it soon loses its property of producing tumors on inoculation, and this change takes place still more rapidly if incubated at body temperature.

Secondary transplantation of tumors has been shown to be preventable by a preliminary inoculation of normal mouse tissue. Rapidly growing tumors of transplantory growth or slow growing tumors have known tendency to spontaneous absorbation. In many of these cases there is even cure of the original tumors where the possibility of spontaneous cure could have been excluded. Bashford warns that this result cannot be obtained in the case of spontaneous tumors, and adds, "Still more emphatically do we warn against applying to the human subject methods which after long perseverance have

enabled us to arrest the growth and even to cure animals of transplanted tumors."

The following points being definitely established by various investigators, a more complete incorporation of cancer material into a vaccine seemed justified as an experiment:

First: The second inoculation of tumors in mice in which the first plant had grown, had a distinct destructive effect upon the first plant, and in turn disappeared itself.

Second: Cancer is not transferable in animals however susceptible they may be, if the inoculated material is kept for some time outside the body even if kept at body temperature. The danger therefore of reproducing cancer is very small and no instance is reported among surgeons where cancer has followed injury of the surgeon's hands by cancer-contaminated instruments.

Third: There had been noted by a good many observers the definite influence on cancer tissue where extracts and emulsions of other cancers had been injected into the patient with cancer.

Gilman and Coca, recognizing all these facts and the hitherto experimental work on human cases, determined therefore in a series of inoperable carcinomas, to try the effect of an emulsion of the whole tumor, thus including in their therapeutic agent all that could possibly be included in the various extracts which had been tried by others, as well as any virtue that might lie in the body of the cell itself. Their initial report may be found in the Philippine Journal of Science, January, 1910. It gives some encouraging results in the relief of pain and cachexia and shows that in some cases where parts of the inoperable tumor were removed after treatment, that some degenerative changes had taken place.

Discussion.—H. A. L. Ryfkogel: Dr. Brown has gone over the subject so thoroughly that there seems to be nothing to add, except that he failed to mention some experiments of Blumenthal. I have seen in one of the recent numbers of the Medizinsche Klinische Wochenschrift a report on some of the experimental work performed by Blumenthal on some implantation tumors of rats. In 1904 he also published an article of similar work on carcinoma of rats, in which the disappearance of the carcinoma was caused by means of heteralogous vaccine. A rat with a rectal carcinoma was injected with an emulsion made from a carcinoma of another rat, the result being a cure. More recently he has made some studies on sarcoma of the rat, and found that it would disappear when treated by vaccine, and he also was able to treat it by a thoroughly autolyzed vaccine, and in this way claimed to have entirely destroyed the possibility of producing new inoculation tumors such as occurred in some of the cases treated by Gilman's method. He found that autolyzed vaccine was of no use after 21 days; that after 8 days it was not as active as it had been immediately after its preparation. His method of preparing the vaccine consists of grinding up the tissue as Dr. Gilman does, then shaking it thoroughly with several times its volume of chloroform water and incubating it for 72 hours. He found that in the animals upon which this autolyzed vaccine was used, that in no case did it produce inoculation tumors, although the original tumor injected did produce tumors. He found that if this autolyzed vaccine was injected into animals in which the same growth had been thoroughly established, that the tumor rapidly softened and disappeared. He tried no human cases with this method.

THE STATUS OF OUR VACCINE WORK IN CANCER.

By P. K. GILMAN, M. D.

Following experimental work, more particularly that of Van Dungern with whom one of us, Dr. Coca, worked for some months, we determined to apply to the human the methods of "vaccine" treatment in carcinoma that has been tried with various results on lower animals.

In an attempt to secure a "vaccine" against a malignant growth, we used various methods of preparation; extracts of tumors, infusions, and differently prepared comminuted malignant tissue. We decided finally that a "vaccine" prepared as follows gave the best results:

"About 15 to 20 grams of carcinomatous tissue is divided as fully as possible with a sharp pair of sterile scissors, then run through a vaccine grinder which gives a pulpy material of even consistence. The addition of a ccm of glycerin before passing the material through the grinder greatly facilitates the passage through the machine. The resulting pulp is shaken up in 20 cc of sterile saline solution and centrifugated for a few moments at a low speed to throw down coarse connective tissue fibres. The supernatant fluid is decanted with the ground carcinoma cells, enough 5% carbolic acid is added to produce a 0.5% solution, and after standing 4 to 6 hours the dose of vaccine is ready to inject."

Injection of the entire amount is made into the subcutaneous tissue; we have used the tissue of the abdominal wall, care being taken to so distribute the fluid as to avoid tension.

The extra malignant tissue we have stored until needed, keeping it sterile in a solidly frozen condition. Some tumors have been kept for 6 months before being used to prepare a "vaccine."

In a series of cases in Manila we have administered such a "vaccine," the cases embracing practically all stages of carcinomatous disease, from early operable cases through possibly operable to absolutely inoperable cases in the last stages.

The injection of the "vaccine" is followed in the majority of the cases by a local, as well as a general reaction. Locally there occurs about the point of injection a painful swelling; the skin is from 24 to 48 hours becoming quite firmly indurated and tender. If there is not too great tension or if there are present no micro-organisms, the swelling lessens in another 24 hours, and gradually subsides, losing its angry appearance and tenderness. Complete absorption may be slow, a more or less firm nodule persisting for several days. This, however, has always finally disappeared, leaving no palpable residue. Some of the masses have progressed to suppuration, the product of the breaking down, however, being sterile, and probably the result of too great tension at the time of inoculation. In but one or two cases have micro-organisms been obtained from the contents of such an "abscess."

The general reaction which has occurred in fewer of the cases, and upon which we do not at present lay great emphasis, consists in a rise in temperature of from 2 to 4 degrees, a general feeling of unrest and malaise, headache and at times slight chilly feelings. These symptoms usually come on about the second day, and subside the day following.

In each case in our series has an operation been done, and it has been just as thorough an operation as the condition of the disease allowed and the condition of the patient permitted. In those patients of the series where a prognosis was favorable, and the disease apparently eradicated, time only will show the result.

In a second group also when an operative cure was possible, though not probable the same test must be waited for.

In the cases which were inoperable, where definite carcinomatous material was necessarily unremoved at operation, the results of repeated injections of "vaccine" at intervals of two weeks have been instructive.

In brief, cachexia is in practically every case cleared up in a great degree following the injection of "vaccine" in three to five days. The mental condition of the patient is improved, the pain—if present—is lessened, the patient has a better appetite, the color of the mucous membranes improves. This change is marked in a very large majority of the cases and only in those patients who cannot "react," being too far gone, has it failed to follow the use of "vaccine."

About the seventh or eighth day following the injection, a change is noted in the carcinoma tissue

remaining in the body. Its character changes from a previously firm mass to a much softer tissue, some cases progressing to a complete breaking down of nodules, 3.5 cen. in size and the area requiring evacuation of the broken down detritus of cellular materials free from micro-organisms. Where masses of cancer have been large, a marked increase in local temperature has been noted both in the cancer itself and in the body tissues immediately surrounding the growth showing active circulatory changes.

In three cases of inoperable carcinoma of the cervix, in two of the bucal mucosa, one of the parotid, two of the cervical glands, and two of the breast, where undoubted cancer was left in the patient, nodules from one to four cm. in size have softened and disappeared, and in other cases—two of the neck,—have masses retrograded sufficiently in size to allow of a more complete removal by the knife than would have been possible otherwise.

The best results have been obtained with several injections at intervals of two weeks. How many injections to give we do not at present know.

Dr. Coca and I left Manila last March and July respectively, and at the time of my leaving but three of the above class of cases had recurred sufficiently to be noted and produce symptoms, all of the series being then one year old—since operation. How long this favorable state will last it is of course impossible to state, but from our work, of which this is a very brief and hurried scanning, we believe the following conclusions are of interest and importance:

First. Large amounts of carcinoma tissue, if carefully prepared and freely comminuted, may be safely introduced into the human system with no unfavorable results.

Second. Such injections produce an unfavorable effect on carcinomatous growths, causing retrograde changes that may be demonstrated under the microscope and consisting in a granular degeneration of the cancer cells, an infiltration of round cells and macrophage type of cells, and an excessive growth of connective tissue extending into the degenerating tumor.

Third. Cachexia is cleared up to varying degrees.

Dr. Coca, to whom all credit is due in this work, is at present at work on the problem in Dr. Beebe's laboratory* in New York. Lately at Dr. Beebe's suggestion we have preserved the tissue in a ground state by desiccating it over acid and spreading it out on glass plates for future use.

A cure of cancer is not claimed by us. We do claim the results noted in the conclusions and trust the work may lead in some way to the ultimate means of a cure.

* Laboratory of Experimental Therapeutics, Cornell University.

Meeting of December 20, 1910.

A Brief Consideration of the Operative Treatment of Hyperthyroidism.

By WALLACE I. TERRY, M. D., San Francisco.

The term hyperthyroidism is here used as expressing more of the pathology of the condition under consideration and as being less objectionable than the other terms, exophthalmic goiter, Graves', Basedow's or Parry's disease.

The signs and symptoms which particularly distinguish the disease are: goiter, exophthalmos, tachycardia, nervousness, tremors, vasomotor disturbances and changes in the blood. Some of these symptoms may be absent, but as a rule the diagnosis offers but little difficulty. One should not hastily conclude that goiter is absent because the thyroid is not apparently enlarged—a process of the gland may be concealed behind the clavicle or sternum or lie deeply in behind the muscles of the neck. That the disease is primarily due to the thyroid gland seems to be so well established, particularly by the results of surgical treatment and organotherapy, as to admit of no dispute. There are, however, those who believe in other causes, such as Federn's theory of increased blood pressure due to absorption of poison from the atonic bowel and the older theory of nervous origin of the disease.

It was long ago demonstrated that the removal of sufficient thyroid tissue led to the cure of hyperthyroidism, but it was not until the technic of thyroidectomy had been perfected by European surgeons, and particularly by Kocher, that these cases were considered surgical. In the United States previous to 1902 but few operations for hyperthyroidism were reported; since that time the number has increased rapidly, so that more than a thousand are on record. There are several districts in this country where goiter is endemic, particularly along the Great Lakes, and in California there are a few small goitrous districts, as was pointed out by Moffitt in 1905. Cases of hyperthyroidism are found in these districts, but in my limited experience the proportion of Basedow cases to the simple goiters is greater in California than in the territory near the Great Lakes.

The pathology of the thyroid in cases of hyperthyroidism is of interest particularly as related to therapy. The researches of McCallum and others have established that there is a marked increase of the active epithelium lining the acini—the acini may be increased in number, they may be packed with epithelium or they may contain papillomatous ingrowths of epithelium. Marine has shown that in dogs active hyperplasia of the thyroid often undergoes a change to a colloid condition, either spontaneously or under the influence of iodin. He considers this process of reversion physiological and not pathological, and furthermore that the colloid goiter is the nearest approach to normal in its iodin content which is reached by a hyperplastic gland.

Indications for surgical treatment of hyperthyroidism: After rational medical treatment for a brief time without marked benefit, these cases are properly surgical—by a brief time is meant not more than three or four weeks. Some cases have been cured by rest alone, others are favorably influenced by rest plus such drugs as bromides, digitalis, strophanthus and iodides. In view of the work of Marine, it seems probable that iodin simply brings about a colloid change in a gland with active hyperplasia, and thus reduces the amount of toxic substance which is elaborated by the epithelium. Organotherapy has been of use in some cases, and Rogers and Beebe report a number of cures with their serum, although other observers have not met with the same success. The point I particularly wish to emphasize, however, is that medical treatment should not be continued unless the patient is rapidly improving, for the damage to the heart and the nervous system from hyperthyroidism is often irrepable. Despite the fact, though, that late or neglected cases are bad surgical risks, I do not think the surgeon should refuse to operate on them after proper preparation, for many can be saved from an almost inevitable fatal result. One distinguished surgeon in this country is quoted as refusing to operate on cases showing edema, irregular heart action and albuminuria with casts. If it be with the idea of presenting good operative statistics, then it is wrong. In my series of cases I have had five extremely severe ones and all have been immensely benefited—indeed I do not hesitate to say their lives have been saved by operation.

Preparation for operation: In the majority of cases, rest in bed with an ice bag over the heart and moderate doses of brimides are of value in putting patients suffering from hyperthyroidism in better condition for operation. The psychic element in these cases should also be studied and the surgeon should endeavor to put himself en rapport with the patient. The method of Crile of daily inhalations of essential oils and later the administration of ether and the so-called "stealing of the goiter" has some advantages and has been employed by me in two cases with success, but deception of this sort will soon be known to the laity and the method will lose its value.

Ligation of one or more thyroid arteries is a very valuable preparatory measure in the severer grades of hyperthyroidism. It is ordinarily a simple oper-

ation as applied to the superior thyroid vessels and leads to marked improvement within a few weeks. As soon as the patient has received the maximum benefit from this minor operation, the removal of one or both lobes of the thyroid should be undertaken, for with the growth of new blood vessels the full circulation will be re-established and the toxic symptoms will be aggravated.

Thyroidectomy: The technical details of the operations are fully given in many publications, but there are a few points from my own experience which I desire to mention. The incision best adapted for the majority of cases is the collar incision of Kocher. When the goiter is small it can with cosmetic advantage be made low down, but in the large goiters the working space is limited by the sternomastoid muscles and the superior thyroid vessels are more difficult to reach. After high division of the ribbon muscles and exposure of the gland capsule one lobe should be dislocated by inward rotation, thereby saving much time in the ligation of the vessels and the disposition of the posterior part of the capsule. It happens occasionally that the capsule is densely adherent to the surrounding structures, sometimes from the effects of irritants to the skin, but more often from a low grade inflammatory process in the thyroid. Whether one or both lobes should be removed is to be determined at the time of operation. The right lobe is generally larger than the left and the excision of it with or without ligation of the left superior thyroid vessels may be sufficient. But one should not, for the sake of completing the operation at one sitting, tax the resistance of the patient to the utmost. It is better in the severe cases to do a comparatively minor operation and permit the patient to make all the gain possible before proceeding with the next. Patients are propped up in bed soon after operation and are usually allowed to get up in three or four days. The after treatment for the first forty-eight hours is bromides in moderate doses per rectum and cold to the precordium—a treatment which was unfortunately omitted in the only fatal case of my series.

Anesthetics: With a trained anesthetist and the use of nitrous oxide for the preliminary anesthesia, I do not now hesitate to operate on certain cases of hyperthyroidism under general anesthesia. I prefer to use nitrous oxide and oxygen for the entire operation when possible, both because of its safety and the absence of post-operative vomiting, but ether by the drop method can usually be substituted for some of the nitrous oxide. In the majority of my cases, however, I have used local anesthesia. The selection of the anesthetic for the particular case depends upon several factors, chief of which are the psychic, the condition of the heart, lungs and kidneys, and the size and location of the goiter.

Personal results: Out of a total of 56 operative cases of goiter, 41 have been cases of hyperthyroidism, and of these one case died within 48 hours of acute thyroidism, making a mortality of 1.8% in the entire series, or 2.4% in the cases of hyperthyroidism.

Out of the 41 cases of hyperthyroidism there were 7 males and 34 females—the age varied from 16 to 62, the average being 34—the duration of Basedow symptoms from 6 months to 16 years—the right lobe of the thyroid was the larger in 29 cases, in 5 cases the left lobe, in the remainder the lobes were equal or the isthmus was principally affected. Exophthalmos was present in 35 cases, absent in 4 and not known in 2 cases, the histories of which were lost. In 8 cases the Basedow symptoms were mild, in 28 they were marked, and 5 they were extreme. The elapsed time since operation is from two weeks to seven years. Thirty patients have been cured, 5 are much improved but have permanent changes in their hearts or nervous systems, 2 patients cannot be traced but were well three months after operation, 3 cases are too recent to determine results, and one patient died. Differential blood counts are recorded in 10 cases and all but one showed either a relative or an absolute lymphocytosis before operation. As the patients begin to improve after operation, the blood count becomes more normal. I have the pathological reports of 22 excised goiters, and while in a general way the glands conform to Wilson's classification, they would have to be studied more thoroughly and in much larger numbers to either confirm or disprove his statement that in a large proportion of cases the symptoms exhibited by the patient can be read from the microscopic picture.

Discussion.—Emmet Rixford: I am very much interested in Dr. Terry's paper, and I would be glad to and do praise it very highly, not merely for the fact that he has made an excellent réhumé of the subject, but because I agree most heartily with practically everything he has said. My own interest in the thyroid gland was developed as a student with the late Dr. Lane in 1889-'91. I mention this because Dr. Terry stated that few thyroidectomies were published before 1900. This is true, yet Dr. Lane performed a great many thyroidectomies, the first in 1858 or 1859. In 1896 he published 18 cases operated upon since 1877. It is interesting in following his work to go back and look upon his original technic, which was to open the capsule and shell out a large proportion of the gland, catching his vessels and using silk ligatures, and draining the wound, and his results compare favorably with the results of the better technic of to-day. He avoided the posterior part of the gland as well as the recurrent laryngeal nerve by ligating en masse and devised a blunt, pointed transfixing forceps to carry his ligatures. The first case of hyperthyroidism which I had ever seen was a case in which I gave the anesthetic for Dr. Lane in 1889. The patient's pulse averaged 140 during the operation. I followed the case as student-nurse, the pulse increasing continually until I counted 200 and even faster by counting every other beat. The heart finally gave out and the patient died on the 5th day. It was a typical case of hyperthyroidism. I think there is no question of the correctness of Dr. Terry's observation that exophthalmic goitre is more common here in proportion to the total number of goitres than in many places. Dr. Terry has said very little about the technic. Possibly the technic is well enough understood, but the choice of cases for the various operations is, from a technical standpoint, a matter of very great importance. The following are questions of importance: In what cases ligation shall be used? Shall the ligation be all that is done in the case, or shall a subsequent thyroidectomy be performed? It would seem from case reports that the ligation is an operation with a considerable mortality, but that mortality is probably to be explained very largely on the fact that the ligation is used principally in the very bad cases. Of course if one has a "statistical conscience" and ligates the arteries in the milder cases, he produces a good statistical record. Some part of post-operative hyperthyroidism follows handling and bruising of the gland in the operation, and especially, as I think Chas. Mayo has pointed out, the handling of those parts of the gland which are not removed. My own cases of exophthalmic goitre I have not yet in shape for reporting, but I have operated upon 23 or 24 cases of exophthalmic goitre in the last 10 years, of which 7 or 8 were of the very extreme type. I have not had a death, though in 2 cases a second operation was required. In none of these cases was a preliminary ligation performed. In a few early cases local anesthesia was used, but in most of them ether was used as a general anesthetic. We often make the mistake of making too small an incision if we use, as I have in the last 8 or 10 years, the transverse incision for cosmetic purposes. But one ought to do a rapid operation, and in order to do a rapid operation the surgeon should make a generous incision. In most cases it would be well to cut the depressor muscles of the hyoid, either above or below, at a distance from the nerve supply. One of the most important

points of the subject from a practical standpoint is how much of the gland should be taken away? Is all of the gland pathological? Or is only a part pathological? Our knowledge of the pathology is not yet competent to answer these questions. We have to do it by rule of thumb, and leave a reasonable amount of thyroid tissue,—it may be too little, or it may be a little too much. If the piece left is only a little too small, transitory symptoms of myxedema will supervene, to subside as the piece undergoes compensatory hypertrophy. If too large a piece is left, or if the piece left is pathological, the symptoms will not be satisfactorily relieved and a subsequent operation is indicated. In one of my cases a second operation was required because of the rapid development of an adenoma in the portion of gland left behind; enucleation relieved the nervous symptoms entirely. The exophthalmos is the most refractory of the manifestations of exophthalmic goitre and one of the most distressing. Partial thyroidectomy is not always followed by disappearance of the exophthalmos. Particularly to be guarded against are the cases of exophthalmos without enlargement of the thyroid gland.

Geo. Rothganger: There is one point in the treatment after operation which was not touched upon, and that is the tremendous amount of care which should be taken in the after treatment and undoubtedly much of the recurrence is due to the lack of that care. A very important point is the great value of early diagnosis so that the cases are not allowed to go to the extreme hyperthyroidism. Some cannot be distinguished from neurasthenia, some from ordinary common goitre, and only when careful examination is made for hyperthyroid symptoms are they detected.

Wallace I. Terry: Regarding the question of ligation of thyroid vessels, I consider it an important preliminary step in many cases. It effects a reduction in the size of the gland, and the general condition of the patients is much improved. The maximum benefit from this simple operation is usually derived in 2 or 3 months and when it is apparent that the patient is not gaining any more, one or both lobes of the thyroid should be removed. As a rule the superior thyroids are more accessible than the inferior and they can easily be ligated under local anesthesia, through small incisions. There should be no shock from this procedure. As regards the amount of thyroid tissue to be left after an excision, one should aim to preserve approximately half an ounce to an ounce of sound thyroid substance.

Section on Surgery; January 17th, 1911.

Exhibition of Case.

By ETHAN SMITH, M. D., San Francisco.

In relation with this case Dr. Freytag will exhibit plates which will show the complicated fracture of the femur. This child was injured in the Park, being struck by a swing containing several children. She was knocked down and dragged underneath the swing. According to the radiograph, as nearly as can be made out, there was a separation of the epiphysis of the head of the femur and injury to the cotyloid cartilage. The margin of the acetabulum is damaged but the condition does not show in this plate. It does, however, show in a plate taken some weeks later. There was a fracture of the neck of the femur at its base and a longitudinal fracture of the upper third of the shaft of the femur in two lines, about an inch apart on its anterior aspect. The extravasation of blood was something enormous, extending almost to the umbilicus and down to the lower third of the thigh. There was no operation done; the case was treated conservatively, and the result I consider to be fairly good. This next plate shows that in front of the neck of the femur there is still quite a prominence. The case was treated with extension by weight and pulley, and sandbags extending from the lower ribs to the heel on the outside, and from perineum to heel on the inside.

Harry M. Sherman: I would like to ask a little information in regard to this case. Dr. Smith stated that he had been treating by traction and sandbags, but he did not mention the amount of traction.

Ethan Smith: I used about 10 lbs. for 6 weeks. Ten pounds at the beginning was sufficient to maintain the extremity at equal length with its fellow, with the foot in the normal line; then the weight was reduced to 6 lbs. and that seemed to hold it perfectly. I find the sandbags are a great aid in maintaining traction. At the time that I saw the case and Dr. Watkins insisted upon my taking charge of it, I thought any operative procedure would have been disastrous. The tissues had stood all the damage they could at the time.

James T. Watkins: When I saw this case Dr. Frisbie had already, upon the previous day, applied an emergency side splint. I was called because Dr. Smith, to whom Dr. Eklund would naturally have turned, was away on his vacation. I was myself at San Mateo, and phoned Dr. Eklund to try to have Dr. Crane or Dr. McChesney meet me at the hospital. He was so fortunate as to find Dr. Crane. On manipulative examination the condition appeared to be worse than even Dr. Freytag's excellent X-ray seemed to indicate. It was a perfectly awful fracture. The shaft of the thigh was bowed sharply forward suggesting a greenstick fracture here. There was undoubtedly an impaction of the base of the neck into the great trochanter, and finally an epiphyseal separation at junction of head and neck. Upon rotating the leg outward the decapitated neck could be felt just beneath the skin in Scarpa's space. More than 12 hours had elapsed since the initial injury, so it seemed to me that operation was, for the time being, out of the question. Had I seen it early enough I should have been tempted to cut down on it and peg or nail it together. As it was, the limb was put up in plaster of paris in abduction extension and slight inward rotation. Dr. Crane concurred in the advisability of this step and kindly assisted me. Shortly afterward Dr. Smith returned from the country and the case was turned over to him. I have not seen it since. Considering the seriousness of the original condition, I think the result is extraordinarily good and I desire to congratulate Dr. Smith upon it.

REPORT OF FOUR CASES OF TUMOR OF THE CEREBELLO-PONTILE ANGLE.

By MILTON B. LENNON, M. D., San Francisco.

The following four cases illustrate better than any didactic lecture the symptoms of tumor of the cerebello-pontile angle.

All four cases point out the necessity of a most painstaking examination of every patient presenting himself with the story of deafness in one ear. Such an examination cannot be too emphatically insisted upon. We will note in the following case reports that one of our patients had a buzzing sound in his

right ear with impaired hearing seven years before we saw him; a second patient dated his deafness four years back; a third consulted an ear specialist for a deafness which came on "without pain or ache" one year before she presented herself to us, without exciting his suspicion; the fourth patient had other symptoms coincident with his impaired hearing, but no earlier symptoms.

The absence of classical symptoms of intracranial growth should not mislead us. Three of our patients had no headache, one despite the most exaggerated symptoms of nerve pressure had no papilledema. Staggering which is so often associated with tumor of the cerebello-pontile angle was lacking in two cases. Unilateral deafness therefore should ever excite our suspicion and lead to frequent and thorough examination of the patient. The otologist must therefore extend his examination beyond the ear, he must be ready to say not only that a man is deaf, but enquire into the cause of his deafness.

I now wish to give the plain facts of the four cases.

Harry W., 24 years of age, was admitted to the University Hospital in the service of Prof. Harry Sherman on May 14, 1909. Previous Illness. Denies Venereal. As a child was struck over the right parietal bone above the ear. Four years ago was struck with a sledge hammer over the junction of the right parietal and occipital bones.

Present Illness. Four years ago the patient noted that the hearing of his left ear was impaired. One year ago his brother noted that he staggered as he walked. Eleven months ago the first headache was felt, and about this time there occurred a transient loss of vision. The momentary obscuration of vision took place frequently. For six months there has been a difficulty in swallowing; the food tending and at times actually regurgitating through the nose. Certain words are difficult of enunciation. His barber noted four months ago that the left side of patient's face was flattened. The patient denies that he was ever dizzy. The report of Dr. Newmark's examination on June 7-8 is as follows: Plantar flexion R. & L. normal. Knee jerks lively R. and L. Patella and ankle clonus can be elicited R. and L. Abdominal and cremasteric reflexes normal R. and L. No disturbance of sensation whatever in lower extremities; no adiakokokinesis; sense of motion and position in the toes delicate. Finger to nose test, at first a little uncertainty R. and L.; later the uncertainty disappears; no astereognosis; moter power is unimpaired and equal R. and L. No adiakokokinesis in upper extremities. Writes well with the right hand. When he smiles he draws the right corner of the mouth more than the left. When he elevates the eyebrows sometimes the furrows appear only on the right, at other times R. and L. Sensation of the face to cotton wool diminished over left as compared to right and this particularly so over the forehead and orbital region. Right corneal reflex is diminished; the left is abolished. The left nostril is not so ticklish as the right. To pin pricks the left forehead is not as sensitive as the right. With tongue protruded, syrup is more keenly appreciated on the right than on the left anterior half of the tongue. Further back he says that taste is the same on right and left. The left side of the face is visibly and palpably flatter than the right. When he closes his teeth the left masseter does not contract in so large a mass as the right. The uvula, back of tongue and pharynx may be touched ad. lib. without provoking a reffex. Marked lateral nsytagmus particularly to the right. No Romberg. When he arises from a chair he keeps his feet wide apart. He walks with a cerebellar gait, staggering sometimes but not always, to the right. He throws his feet wide apart when walking. Double papillitis. Marked dysarthria though he talks fast and much. Deglutition complained of, with regurgitation of food. Headache insignificant—when present is over the fronto-parietal region on the left side. There is no tenderness over the occiput. Hearing impaired right and left, much more on left, however, than on right.

The aurist's report is as follows: Both ears affected, apparently a middle ear catarrh; left much worse than right and indications of involvement secondarily of internal ear.

More enlightenment being asked he reports: June 4th: Right ear watch $\frac{12}{36}$ — Rinne. Webster test referred to right ear.

Left ear watch 0. Hears loud voices.

On June 16, 1909, the patient was operated on by Dr. Sherman. Palpation and inspection in so far as the area admitted, revealed no tumor. Ziehen and others have had similar experiences.

The examination of August 25, 1909, will give a fair picture of the patient subsequent to the operation.

Still some vomiting, a condition extant in a greater or lesser degree since the operation; is still somnolent; still involuntary urination; answers questions slowly but is intelligent; articulation thick and slow; still quite deaf. Cotton wool felt better on the right side than on the left; slight facial paresis left side on all three branches; left side of face flat and masseter seems less in volume on the left than right. Touch and pain same on both fore arms; elbow reflexes very faint; radical reflexes not certain. The patient cannot sit up unassisted. He moves his legs easily, puts either heel on opposite knee, no very evident uncertainty. The knee jerks are easily obtained right and left but are rather sluggish. Ankle clonus right and left and it is gotten by tapping tendon rather than by dorsi flexion of the foot. Sensation the same in both legs. Cannot tell easily when the toes are moved. Swallows with difficulty. Grip fair right and left, perhaps stronger right.

Harry M. (Case I)—Showing tumor in left cerebello pontile angle. Left cerebellar hemisphere had prolapsed through the opening in the skull.

November 1, 1909. Exitus—Autopsy showed a tumor to the left of the pons and medulla compressing the left lobe of the cerebellum. Dr. Lee of the University of California, diagnosed the tumor as a fibro sarcoma.

Case II. On October 14, 1909, Prof. J. H. B., 42 years old, presented himself to Dr. Newmark with a letter from Drs. Barkan and Sewall, and the following record. He consulted Drs. Barkan and Sewall

upon the advice of Prof. Ray L. Wilbur for the first time on March 20, 1909. A year before he noted that when he turned quickly he became dizzy and in the preceding July had a transient diplopia. This did not recur for several months, but in the interim he had a certain difficulty in following objects. Seven years ago he began to hear buzzing sounds in his right ear and this, with an impairment of hearing, has since persisted. He complains of a feeling of fullness in the head and a pain at the base of the skull. In March the fundi were found normal. The ear examination: Right—bone conduction grandenigros 5 seconds>air conduction; watch negative, medium low whisper contact. Left ear—Bone conductions. Grandenigro 15 seconds<air conduction; watch 30-36; low whisper 8-8. He was told to return, but did not until August when he again presented himself. Has had frequent diplopia and the right eye had frequently shown a tendency to inflame.

Examination. A slight nystagmus, particularly when eyes turned to the extreme right. The pupils react promptly to light and accommodation. Ophthalmoscope shows choked disk on both sides. Some retinal inflammation. Disks much swollen (4 D.: R. & L.). He called again in October when he was referred to Dr. Newmark. In addition to the deafness, diplopia and impaired vision, the patient says that he has had a peculiar numbness of the right side of his tongue and cheek for three years and that there is sometimes a biting sensation in this area. As early as a year ago last summer he had a tingling sensation at the right angle of the mouth. He has some difficulty with his teeth along that side of the mouth at this time. He has had no difficulty in swallowing. Has no headaches but a sense of fullness in the head.

All reflexes of arms and legs active and equal; the abdominal reflexes are not obtained; sensation over trunk and extremities unimpaired. Diminished tactile sensation over right side of face and forehead; pain and temperature not so well appreciated in this area as well as on the left side. Corneal reflex less on right side than left. Tickling the right nostril felt much less than on left. The right side of the mouth and soft palate much less sensitive than the left. Sense of smell seems unimpaired. Nystagmoid jerking to right and left; weakness of the right external rectus; the nystagmus is more to the right than to the left. Rotatory nystagmus when the patient looks upward, the rotation being to the right. The patient's vision was fast failing, and with the hope of saving it, a decompression operation over the right parietal and temporal region was performed by Dr. Stillman. On the following day the patient was totally blind. No further operative procedure was suggested. Autopsy disclosed a tumor in the right cerebello-pontile angle.

Case III. Kitty D., 24 years of age, was sent to us by Dr. C. C. Mohun in February, 1910. Finally history: Negative; no recollection of previous illness.

Present Illness: About a year ago "without pain or ache" the hearing in the left ear diminished and the patient now thinks it entirely gone. She was treated by an ear specialist. About 6 or 8 months ago had slight headache, but none "in the longest time." Vomited once about 4 or 5 months ago, but thinks it due to biliousness. About ten months ago during the time when her ear was being treated there occurred a transient blindness, lasting but a few seconds. Two months ago she consulted Dr. James Franklin Smith who told her that her eyes were seriously diseased. She noted trouble with her sight as early as 8 months ago, and that the sight in her left eye was particularly poor. For some months—she cannot say how many—her head has bothered her—she can't say what she means by bothered—except that the head did not feel right. About six months ago if she looked to the left or to the right she had a pain in her head, where—she cannot say. She positively states that she has no headaches. There is no difficulty in swallowing.

Eyes react to light and accommodation. Pupils equal; no nystagmus; double papillitis going on to atrophy in both eyes; more marked left. Gross test shows fields much limited especially on the left. Does not feel cotton over left cornea as well as on right. Nostril not as ticklish left as right. The objective reaction corresponds to the subjective sensation. Heat, cold, pin and cotton are felt equally and plainly on two sides of face. At times it seems that she feels cotton better on right than on left. Noted salt solution better on the right anterior half of tongue than on the left corresponding side. Power in upper and lower extremities equal on both sides and good, reflexes all present and lively. No changes in sensibility in the upper and lower extremities. When walking no ataxia; faint Romberg; when she brings the left index finger to the nose there is a slight jerkiness. Masseters strong and equal, tongue is protruded in straight line—watch ticks cannot be heard on left side.

On July 28 still no headaches; yesterday when arising from the recumbent position became dizzy and fell to ground.

March 17th—Hydrar and iodide have been tried with no result. Left disk more atrophic; pupils still equal and react to light and accommodation; movements upward and downward and the left and right O. K. Slight rotary nystagmus; corneal reflexes slightly livelier on the right than on the left. Pin pricks consistently said to be sharper on the right forehead and infraorbital region than on the left; over the chin they are the same on the two sides. For cold and warmth the difference between the two sides is the same as declared for the pin. Masseters equal on the two sides—no motor facial involvement. The gag reflex is diminished. Tongue O. K. Smell O. K. No difference noted upon pressure of the two sides of the occiput. Nose to finger test, a slight backwardness of the left hand as the finger approaches the nose. Dr. Walter Scott Franklin noted a decided difference in sensation between the right and left inner side of the nose, the left being decidedly less sensitive. The labyrinthine tests on the left side—water, chair, electricity negative. Dr. Franklin is certain that the deafness is of intracranial origin. The patient cannot see to read with the left eye. She reads with the right. There is slight staggering, but to no particular side as the patient walks. Pulse 88.

Dr. Sherman will delineate the steps of his operation, and his removal of a cyst from the left cerebellopontile angle. It was easily grasped with forceps and dropped into my hands. In size it was similar to a pigeon's egg, its contents were clear; microscopic examination of the wall showed it to be thickened pia arachnoid. Borchardt has described a similar case.

Case IV. Frank C., 45 years of age, entered St. Luke's Hospital under the care of Dr. Chas. Clinton on June 29th, 1910.

As a child he had epilepsy and this has persisted up to the present. Twenty-six years ago he acquired a chancre without secondaries for which he was treated for 12 months.

About 4 months previous to his admission to the hospital he began to have sharp shooting pains in the head mainly on the right side. They were persistent, but not always equally severe. At about the same time the hearing in his right ear lessened and now he is quite deaf. A difficulty in vision was a further incident at about the same time. He saw double. He could, however, read easily with either eye alone. Likewise he dates a certain staggering in his gait and a marked dizziness to four months ago. During the past few months he has not noted the passing of the razor over the right side of the face as the barber shaved him. Saliva runs from the right side of the mouth.

On July 28th the findings of Dr. Leo Newmark were as follows:

N I. O. K. if any difference better right than left. N II. Can read the smallest print in the Chronicle with each eye separately, with the aid of his glasses. Fields to the finger test O. K. Discs looked rather gray, caps very indistinct. Papillitis not visible.

N III. N IV. Unaffected.

N VI. Abduceus paralysis on right. Nystagmus well marked in all directions. Subconjunctival hemorrhages on right.

N VII. Paresis well marked in all three branches on right.

N V. Well marked anesthesia to different stimuli in all three branches on the right; was not certain of involvement of the motor V because he would not contract the masseters properly. Jaw deviates when the mouth is opened slowly, but not to right.

N VIII. Deaf right; hears left.

N XIX. Posterior portion of tongue seems to have its sensation. Palate does not rise energetically on intonation, but there is no difference between the two sides.

N X. XI. XII. O. K.

Frank C. (Case IV)—Showing tumor in right cerebello pontile angle. The line indicates the position of the tumor.

Speech is thick and indistinct; not due solely to facial paralysis, but distinctly to abulbar character. He says that he can swallow O. K. and without regurgitation, but on account of not feeling food on the right side it collects there.

Cerebellar staggering: Resident physician says that it is always to the left. Reflexes of upper and lower extremities equal on the two sides and exaggerated. No jaw jerks. No anesthesia of any kind in the extremities, no astereognosis. Sense of posture of fingers of each hand O. K. In finger to nose test a little uncertainty right, none left; and right hand improves rapidly with practice.

Aug. 8-9. Is considered by the doctors and nurses to be getting worse. A month ago could walk about, now cannot keep his balance. When he entered the hospital the facial paralysis was debatable, now is well marked in all three branches. When he opens his mouth at first it deviates far to the paralyzed side, then suddenly comes back to the middle line or beyond it. No astereognosis. Motor power in extremities not disturbed. Sense of posture in fingers O. K. In finger to nose test passes the tip of the nose almost regularly at first, but improves on repetition; this is more marked right than left. Eye grounds seem normal; disk rather gray. No ankle clonus; no Babinski; no Oppenheim.

On Aug. 10, 1910, I noted that the faradic and galvanic irritability of the nerve and muscles of the right side of the face was much reduced; no qualitative alteration. The breathing during my visit was at times Cheyne-Stokes in character.

Aug. 11, 1910. The patient died on the operating table before the dura was opened. A tumor was found in the right cerebello-pontile angle. It was partly cystic, partly solid in character and deeply grooved and compressed the right half of the pons. It was firmly adherent to the dura mater from which it probably sprang. Microscopic examination found the tumor to be sarcomatous in character.

So much for the clinical report of these four cases. Dr. Sherman will illuminate the surgical aspect of three of them, and to him I yield, but not before I offer to him and to Dr. Newmark my thanks for their graciousness in choosing me as the reporter of these splendid cases.

THE OPERATION TO EXPOSE THE CEREBELLO-PONTILE ANGLE.

By HARRY M. SHERMAN, M. D., San Francisco.

There are, of course, no special local principles in opening the posterior fossa of the skull. But there are, of course, certain local conditions to be taken into account and certain local objects to be attained. I wish to point these out in the course of relating the details of the operations I have done.

The position of the patient is of moment chiefly, I am sure, for ease of access by the surgeon. In my operations I put the patient on his side and kept him in that position by a rack which held his chest and prevented his rolling over, but did not interfere with his breathing. The head then rested upon a sand pillow and so was in a position to be approached at the back, but better upon the upper than the lower side. The table was then inclined so that the head was much higher than the feet to lessen the tendency to hemorrhage which often exists in cases of brain tumor with high blood pressure, and also to save cerebro spinal fluid which can run out less easily in the head up position.

I am quite sure now that the head up position is unnecessary. It seems obvious that the effect of posture will be as great inside the skull as outside it, and that the general blood pressure might even have to be increased in order to deliver to the inside of the skull sufficient blood against the force of gravity. This, of course, would not tend to lessen hemorrhage.

The loss of cerebro spinal fluid has been, as I have seen it, a matter of no moment. I have sometimes nicked the dura mater in the course of an operation upon the Gasserian ganglion and much fluid has run out, so that its presence in the wound was a great disadvantage, but its loss by the patient was of absolutely no moment. I have exposed the spinal cord just below the axis, and have lost all the cerebro spinal fluid that would run out of an extensive wound in the spinal dura mater with no injury to the patient. In one of these posterior fossa operations the cerebro spinal fluid could be seen rising and falling in the foramen magnum as the patient breathed, while in the skull and in the cerebral ventricles was only such as had not run out, and it was, of course, under no pressure, and yet the loss of the normal extravascular pressure, maintained by the presence of the fluid, wrought no harm to the patient. Undoubtedly the prone position with the shoulders so supported that the respiratory movements of the chest are free and the head held with the neck flexed, so that the whole of the occipital bone is accessible, is the preferable position.

The incision called by Harvey Cushing the "cross bow" incision is the best planned. Cutting only the skin on the first level, along a curved line above the superior curved line of the occipital bone, and the aponeurosis and muscle on a little lower level, so that the flaps can be wholly turned back from practically the entire occipital bone, and yet the incision shall be in tissues which unite firmly and with a scar which does not stretch, is a distinct improvement on the earlier plans of cutting directly to the bone from the surface. Again the split of the flap in the middle, changing the simple curvilinear incision into a "cross bow" and permitting, as Cushing points out, the lateral reflexion of the two flaps, is an advantage in that it gains room.

The bone exposed is different from that of the rest of the skull in that it has no diploe and is often very thin. Therefore it must be trephined very carefully—in fact I think it had better be opened by

a burr, or Doyen's perforator, and the fact of the thinness constantly kept in mind. The small opening once accomplished it can easily be enlarged to any needed extent by rongeurs. Cushing says "upward, so as to expose the lateral sinus in each side; across the median line, leaving intact the bone over the torcular; and then downward so as to include the posterior half of the foramen magnum."

As the bone is the most important connective tissue in the path of the opening, and as the size of the opening in the bone controls, more than anything else, the work which may be done inside the skull, it will be well to quote, at this point, the different opinions regarding the opening of one side as against the opening of both sides simultaneously. Really these opinions are not many. Those books which offer themselves as exponents of operative technic say but little regarding this particular operation or generalize very vaguely. Bryant does not consider the opening of both sides at all and Bickham is in the same category—Jacobson follows Frazier in his teachings, and Kocher, while giving the preference to an opening of one side only if the diagnosis implicates only one side, agrees that, if it be known to be necessary, both sides may be opened, and quotes Cotterill that the brain will not be injured by so doing. To expose the bone Kocher uses the large semicircular flap, base down on the neck, and perforates the bone with a trephine, its opening then being enlarged by rongeurs.

Frazier in 1906 wrote in favor of the opening of one side alone by an incision along or above the superior curved line from the mastoid to the middle line and then one downward in the middle line of the nucha. For cases in which the tumors cannot be localized, or when, "for any other reason a radical operation is not deemed feasible a less mutilating incision will answer the purpose quite as well. A vertical incision should be made, beginning a little above the superior curved line and extending downward for a distance of three or four inches." Frazier likens this incision to a muscle splitting incision in the temporal fossa, and points out the resemblance of one locality to the other, each having thin bone under considerable muscular tissue. If for any reason, both sides need to be opened Frazier advises a second lateral muscle splitting incision to open the second fossa and points out certain advantages the plan has over the conventional incision. He does not say, however, that he has used the method, and I can agree to its probable value only if one side alone is to be opened in search of a tumor of the cerebellum which is located superficially and posteriorly. For an adequate exposure of the anterior part of the posterior fossa, the favorite site of tumors, a much larger opening than is possible through a muscle splitting vertical incision seems to me to be absolutely necessary.

Cushing in a letter to me answers the question very definitely and I quote what he says in describing his own practice. "I can easily answer your question. I do make it an invariable rule to remove the entire occipital bone below the muscular attachment, from mastoid to mastoid and including the posterior half of the foramen magnum. Without doing this and freely opening the dura across the median line any extensive manipulations are carried out only with great risk and with a certainty of needlessly damaging the cerebellum. Most cerebellar procedures are carried out if possible by a one-stage performance. The wound is such an enormous one and requires such careful suturing in several layers that a second stage is necessarily attended with more risk than is the case with operations over the cerebral hemisphere."

Getting out of the skull and closing the holes is quite as important as getting in and having enough room. In this location all the coverings of the brain cannot be replaced for the osteoplastic method has been impossible in the bone. Therefore it is important to close the dura mater through the whole of the extent of the incision in it. I must be considered as emphasizing this point as my second case will demonstrate. Over the dura mater are sutured the muscular and aponeurotic layer and then, higher up on the skull, the skin.

A typical decompression operation should leave the dura unsutured, or should excise a piece of dura mater, so that the brain may extrude beneath the muscular layer, and yet be held in and covered by that layer. Frazier points out that to gain room in the skull and even room that may be ample for decompression purposes, it may not be necessary to incise the dura, and in this locality I think it will be plain, that, if the dura is incised it must be sutured.

Here as elsewhere the question of one or two stage operations has come up and I am bound to admit that the question has here some application. At the same time I must insist that there is and always will be an argument against a two stage operation when the work can be completed in one stage—that is, an operation should always be begun with the intention of its being completed under one anesthesia unless, during the doing of it, circumstances arise which make it necessary to stop. This alone will excuse a second stage under a second anesthesia. Cushing's opinion and practice have already been quoted.

Case one. Doctor Lennon has reported the neurologic side and all that I have to do is to detail the surgical work. I operated with the patient on the side and in the head up position. I opened only the left cerebellar fossa. When the dura mater was opened the cerebellar hemisphere protruded and much cerebro-spinal fluid ran out. It then seemed as if it would be impossible to push the cerebellar mass aside so as to see into the angle in front of it. However, after a little effort the cerebellum seemed to shrink, as if a cyst in its interior had emptied, and as it shrank it could be compressed and the space in front seen and palpated. No tumor could

Fig. 1 (Case I)—Shows decompression tumor after unilateral opening of the posterior fossa of the skull. Dura mater not sutured.

be found. The dura mater was left unsutured. The muscular and cutaneous flap was sutured in place over the cerebellum. The patient made an uneventful recovery from the operation and a hernia of the cerebellum soon appeared under the muscles (Fig. 1). This went on to a large size and remained so until the patient's death. Now, inasmuch as I found no tumor at the time of the operation, and yet a large one was found at the necrospy in the very place predicted by Dr. Newmark, I have always regretted that I did not open the fossa a second time. The fact of the large decompression tumor should have been taken as evidence that a tumor or other pathologic condition was present and might be amenable to surgery. At any rate, opening and looking in to see would not have done the man any real harm.

Case two. In this patient, who was also operated upon in the head up position, I began with the inten-

tion of uncovering both fossae, and so made the Cushing crossbow incision without, however, terracing it. In using the trephine over the left hemisphere I miscalculated the resistance and the thickness of the bone and the instrument slipped in and cut a curved gash in the dura 1.5 to 2. cm. long. An endeavor to suture this proved futile, for the material would not hold stitches. Therefore, although there was an inclination on the part of the cerebellum to extrude, I went on and removed all the bone as described by Cushing. When this had been completed the patient went into collapse and I had to stop. The skin and muscle flap was sutured over the dura mater, still leaving—because I could not close it—the dural wound unsutured in the hope that the support of the flap and adhesive processes would seal it. Four days later the patient was again anesthetized and the wound reopened. The adhesive processes I had hoped for had not occurred and broken up cerebellar tissue had pushed out of the dural slit and was between the dura and the muscle. At this time the dura was opened freely on both sides, the left cerebellar remnant was pushed to the right and the angle between the cerebellum and pons was exposed. A cyst of the pia mater was found lying on the floor of the fossa and close against the posterior surface of the temporal bone. This was removed leaving the space clear. By this time the patient was again in collapse and I had to close the wound as rapidly as possible, and so, believing that as the tumor had been removed there would be no excessive hernia I left the dura unsutured. This was an error. A large hernia, or decompression tumor has developed which is a great blemish if it is nothing else. However, in the light of the experience with my first case I am going to reopen this patient's cerebellar fossae and see what is there, and perhaps attempt to suture the dura even at this late date or make a firmer closure of the

Fig. 2 (Case II)—Shows decompression tumor after bilateral opening of the posterior fossa of the skull. Dura mater not sutured. Side view.

skin and muscle coverings. I call attention to the photographs (Figs. 2 and 3) which show that the tumor is larger on the right side, where there is an entire cerebellar hemisphere. Tests show that this hemisphere is functionating properly while the left is not, but the right hemisphere is not substituting for the left as I hoped it might do. I based this hope on the statements of Frazier who reports having "deliberately removed from one-quarter to one-third of the cerebellar hemisphere" and he attributed to this extreme measure a decompression effect, and spoke in another place, of the slight effect this had on the total cerebellar function. Consequently I have the strong opinion that there is still a pathologic condition other than the lack of dura mater, which may be discovered and relieved.

Case three. I am going to speak of this case only to criticize my own relation to it, and that of one of my assistants. I appreciated the serious condition of the man and had ordered that the blood pressure should be watched, with the sphygmomanometer during the whole operation. I saw the apparatus in the room and that it was in an interne's hands. I did not watch it put on and in commission, and it never was put on. I acknowledge I should have known of this disobedience earlier than I did; as it was I was not aware of the imminence of danger until it was upon us and the man stopped breathing. Again, Cheyne-Stokes respirations had been observed before the operation, but not recorded. I myself had not seen them. The omission to record them made the observation of them of no value to the patient. Probably the omission may have been of no moment in its effect, but looking back over the case I think it is plain that, with a proper system of artificial respiration here, such as the Meltzer and Auer, we should have been able to have operated

Fig. 3—Back view of Case II.

upon this man easily in spite of the tumor's pressure upon his medulla. I know that I shall always feel that I should have thought or known of the specific danger and have planned the way of averting it. In this patient's case I again nicked the dura mater in spite of great care to avoid it. This was due to the greatly varying thickness of the skull and the trephine circle covering both a thick and a thin place at the same time. The operation, changed into an autopsy, demonstrated phenomenal thickness of much of the occipital bones. It is because of this special possibility in this particular bone that I think a trephine should never be used on it, but that the bone should be opened by perforator or burr.

Discussion. H. E. Castle: We have a very vivid lesson brought before us to-night by these two papers being read together. It shows us the necessity of correlation and departmental association in medicine. We have here cases that were sent to the surgeon that were produced unnecessarily and were in all probability avoidable. These cases came to Dr. Sherman not as primary tumors but as secondary diseases produced by the pressure of tumors and the lowering of the vitality of the patient. One case was reported that had been standing 7 years, and another 4 years from the time the initial ear symptoms appeared. It is entirely unreasonable to send a case to a man expecting to get good results from operative procedure after it has stood from 5 to 7 years. In the first specimen show here the medulla, pons and the basal ganglion were all so pushed out of shape that the patient must have been in a deplorable condition. The operation to remove a small tumor of the cerebellar pontile angle is not a grave or difficult procedure; it requires a little extra technic, a little extra judgment on the part of the surgeon, and a little more careful handling of tissues than operations elsewhere. The cerebellar pontile angle can be reached in a way that is practically safe. We have a great lesson to learn in not sending these patients to the surgeon after they are incurable. Do not send them,—he can do nothing with them. My attention was called to the departmental asso-

ciation in diseases of the abdomen when attending the Academy of Medicine in New York where I heard J. B. Murphy, Jacobi and Wyeth read papers, wherein they showed how the great diagnostic ability of Jacobi, when associated with Murphy's dexterity and technic, worked out to the saving of patients' lives. There were no cases that Prof. Sherman reported to-night that should have gone to him. It is an injustice to the surgeon to send him such cases and the otologists, neurologists and other men who take it into their hands to treat these cases for 3 to 5 years ought to sign the death certificates—the surgeon has no right to be called on to perform that function. How often now do we get a case of blown up appendix with general peritonitis? Seldom. Why? Because now the internists send their cases to the surgeon at the proper time. How many men operate on the typical disease that Basedow, Graves and Perry described years ago? Not very many. Hyperthyroidism is now a disease that we operate. They get well. We do not get the chance to operate on cases with bulging eyes, diarrhoea, great emaciation, rapid heart and other symptoms that go with Basedow's disease. Prof. Sherman has shown us this evening that these can be operated and that they will not necessarily die from operation. He had trouble with bulging of one of the cerebellar lobes but this practically always happens on account of the intracranial pressure in these late cases. Every death I have witnessed during operation has occurred just as the tumor was being removed, the patient succumbing to respiratory and cardiac failure due to shock. Obviously this disaster will occur most often in the removal of large tumors, it perhaps being due to an extreme sudden change in intra-cranial tension. We are of the firm belief that the advance of surgery of the brain depends in a great measure on early operations which will permit us to deal with the primary lesion.

Cullen F. Welty: Dr. Lennon has called your particular attention to the findings that were present in all cases, viz.: deafness, vertigo, nystagmus, and with such symptoms associated a diagnosis is almost absolutely certain with but few exceptions. The two great forms of deafness are otosclerosis and labyrinthian deafness, (the latter commonly spoken of as nerve deafness), are very easily diagnosed by the tuning fork. In each the ears are similarly affected, by that I mean the tuning fork will show little or no change in the ears of the same individual. However, the deafness of a cerebellar tumor will always be associated with a labyrinthian deafness, besides, the tuning fork will show a much lessened bone condition on the side of the new growth. This is practically the only condition that will give you such a picture with the exception of fracture of the base through the petrous portion of the temporal bone, or the remains of a Manier's disease, either one of which would be easily elicited by a careful history. Every case had vertigo. I will not say all, but most cases of vertigo are associated with nystagmus of one form or another. In the cases reported it was horizontal, vertical. In some instances it was to the side of the tumor, in others to the opposite side. I will attempt to make clear why this is so. With the caloric reaction of the semi-circular canal, there would be a nystagmus to the opposite side. However, the communicating links must be perfect or the impulse will fail to produce the characteristic reaction. If the canals are destroyed, or the communication destroyed by pressure of a new growth, there naturally can be no reaction, this comes when the way is completely blocked. At the same time there is nystagmus to the opposite side, this is due to the overbalance of the destroyed canals on the opposite side. So the new growth should be located on the side on which the ear ceases to react, the patient will also be very deaf on this side, and again when the nystagmus is most marked toward the same side, is when the growth acts as an irritant in Deiter's area, not shutting off impulses, but inducing them, the nystagmus will be to the same side, there will not be so much deafness. The determination of the degree of deafness or absolute deafness is very important, it has been demonstrated beyond doubt that it requires special appliances to speak with certainty in individual cases. In the diagnosis of cerebellar abscess, following destruction of the canals, there was first a nystagmus to the opposite side, which subsided and disappeared entirely in the course of a week or ten days. Were you now to inject cold water into this affected ear there would be no reflex reaction. If any time following this destruction of the labyrinth (from disease or operation), nystagmus appears on the same side as the affected ear and increases in degree from day to day, an absolute diagnosis of cerebellar abscess can be made. The nystagmus in this instance is due to pressure in Deiter's area on the same side, the same holds in a growth when the impulse to the ear is cut off. Differential diagnosis between canal affection and cerebellar tumors are made by the revolving chair. Those with affections of the canals will always fall in a certain way, that is, with regard to the position of the head and the canal affected, while with cerebellar affections they do not follow any rule.

We are indebted to Barrany of the Poliyzer Ear Clinic for the perfection of these different tests, besides many more that become much more complicated.

I think Dr. Lennon is to be congratulated in picking out the three important symptoms that are almost proof positive of cerebellar new growths.

Wm. Ford Blake: I wish to say a word to emphasize on the responsibility that rests upon the eye man who may first see these cases because unquestionably, as a rule, the early signs are seen in the eye. Experience has taught that tumor of the nerve head is not necessarily an early symptom, in fact it is very frequently a late symptom, but Cushing and Bodley, Gunn and Patton and Horsley pointed out the diagnostic assistance and value gotten from a perimetric examination of the field. In practically all of these cases there is a contraction of the form field for white; there may be an alteration in the size of the field for blue, which is normally greater than the field for red. In addition to these changes there may be a bitemporal loss of color for red or blue,—most frequently for blue. The men who are doing brain surgery have come to rely upon the change in the form field as an early and positive sign for surgical intervention. Marius Gunn classified the picture in the fundus into four stages and advocated surgical intervention in accordance with the stage of the papilloedema.

1st—Contraction of form fields and change in color fields with overfilling of the retinal veins.

2nd—Exaggeration of the first stage with possibly a slight prominence of the disc head.

3rd—Continuation of all these with possibly a little hemorrhage.

4th—Marked increase of the preceding signs with a good deal of retinal hemorrhage.

He advocates that operative interference may be undertaken in the first and second stages, particularly in the first, with absolute assurance of maintaining patient's vision. In the third stage that the vision may possibly be improved. In the fourth stage the consequent edema that ensues, following intracranial operations, simply increases the tension already in the nerve-head, and blindness, if not already present, is practically sure to ensue.

Harrington B. Graham: There has of late been some very interesting work done by Docent Barany touching on the differential diagnosis in vestibular and cerebellar affections which has not been mentioned this evening. At the International Congress at Budapest he read a paper on the Romberg symptom in which he brought out the facts that if a patient be placed in the position for the Romberg test after he has been turned in a turning chair to produce a nystagmus, say to the right, he will fall to the left; if now his head be turned to the left without turning the body he will fall backwards, if

his head is turned to the right he will fall forward. If there is any interference with the vestibulo-cerebello spinal tracts as, for instance, cerebellar tumor or abscess, hemorrhages, tubercle, gumma of the cerebellum or pons, etc., this normal relationship of the nystagmus, position of the head and body and direction of falling is lost. Again if a patient without any cerebello-pontile trouble is turned on a turning chair, say to the right, so as to produce a nystagmus to the left and is requested to point with hand or foot, with his eyes closed, at an object held in front of him, he will point to the right of the object; if the nystagmus produced is to the right he will point to the left of the object, if it is a vertical nystagmus he will point above or below the object according as the nystagmus is downward or upward. This pointing to the side of the object according to the position of the head and the direction of nystagmus does not occur if the vestibulo-cerebellar tracts have been interfered with, the patient pointing directly at the object or always making an error in the same direction regardless of head position. In case the interference is on one side the hand or foot of the side affected will point accurately while those of the other side will point to the side of the object. If the patient attempts to point at his own nose after the turning he has no difficulty at any time unless the cerebro-cerebellar tracts have been involved.

Thomas G. Inman: I should like to call attention to certain factors connected with the handling of these cases which are worthy of more consideration than has been accorded them. There still remains the tendency to follow the teachings of a few years ago and subject these tumor cases to a preliminary treatment with mercury and iodide of potassium. In the presence of a negative Wassermann I believe this should not be done. The results are sometimes misleading, as in many non-syphilitic brain tumors temporary amelioration of the symptoms may follow; the growth of the tumor continuing meanwhile. Too, there is the temptation to wait until a focal diagnosis can be made. In the presence of increasing symptoms this may be inimical to the best interests of the patient. Before any symptoms may become prominent, decompressive operation should be performed. These patients are the subjects of increased intracranial pressure. The extent of this pressure is difficult to ascertain; the point at which intolerance may be reached is impossible to foretell. The slightest change may be sufficient to invite a fatal issue. Therefore, before being subjected to any operative procedure these patients should be depleted, preferably by hydrogogue catharsis, and, perhaps, an hour or two before operation, a few leeches to the temple might be instrumental in warding off a bad result. The position of the patient at the time of operation is of the utmost importance. Horsley in 1906 made this statement: "This question of position of the head is no mere matter of convenience to the operator; it is an extremely serious one to the patient for the satisfactory performance of the operation, and is only to be secured by having a suitable head rest such as the fork rest of Prof. Frazier or the one I use." The operating table used by Prof. Frazier, which can be tilted to any angle, is of undoubted value, but whatever other kind is used before proceeding to open the subtentorial space, the forehead should be placed against a fixed arm or rest in order to prevent undue flexion of the head upon the chest. That such a precaution is necessary is made evident by a consideration of the following facts: In the subject of brain tumor the intracranial pressure may be so great that any sudden increase in that pressure may cause death. If, then, the attempt is made to open the subtentorial space without this head rest, which acts as a counter pressure against the forehead, the head, under the pressure of the trephine or other opening instrument, flexes upon the chest, pressure is made upon the great veins of the neck and, the outflow of blood from the brain being thus hindered, the intracranial pressure is suddenly increased and the patient may die upon the table. Furthermore, the patient should be prepared, before beginning the operation, for a lumbar puncture for two reasons—first, sudden edema of the brain after the dura is opened may necessitate the procedure in order to prevent serious injury to the brain substance; and, second, sudden cessation of respiration due to compression of the medulla might be relieved by forcible injection of salt solution into the spinal subdural space. But do not forget in this emergency to lower the head of the table, and have an assistant practice artificial respiration while the operator quickly opens the head.

Sol Hyman: From a perusal of the literature one is forced to the conclusion that the surgery of the cerebello-pontile angle is far from a closed subject. Clear as the indications are, a technic which is safe and applicable by the general surgeon has not yet been developed. Dr. Sherman has detailed some of the methods of entering the skull, and of final closure, but has not devoted much space to the procedures to be followed in exposing and removing the growth. Large numbers of these patients in the hands of very many operators die, either on the table, or a few hours later from collapse which has occurred on the table and is never recovered from, or which has occurred suddenly shortly after the conclusion of the operative interference is completed. From the literature I have gained the impression that the operative shock commonly sets in just after the dura is opened—that is, when the space into which the cerebellum and medulla (and tumor) are crowded is enlarged. This enlargement of the posterior fossa seems to produce the shock. These tumors, lying as they do in the cerebello-pontile angle, compress the aqueduct of Sylvius and so produce a hydrocephalus. It is conceivable that the release of pressure below the tentorium by the opening of the dura mater will not relieve the hydrocephalus, and the cerebral peduncles are thus forced, by the supra-tentorial pressure, downward through the foramen in the tentorium. This sudden dislocation of the brain-stem, particularly if it be such as to affect the bulbar mechanism, is distinctly to be avoided. It is also conceivable that this sudden dislocation of the brain-stem may be diminished by relieving the hydrocephalus by means of a ventricular puncture performed before the dura mater of the posterior fossa is opened. In the hands of Fedor Krause and others this method has proven dangerous, but, I believe, warrants further trial. Cushing in a recent paper in the Interstate Medical Journal, says that if, after opening the dura, the arachnoid cisterna in the cerebello-bulbar angle be quickly punctured, much of the cerebellar dislocation and shock can be avoided. This is a distinct advance in the technic. The most striking fact gleaned from a careful study of the literature of this subject is that the general surgeon who has the opportunity to operate upon patients suffering from brain tumor at infrequent intervals, has a mortality in his cerebello-pontile cases of 100 per cent. Better results are so rare as to be glaring exceptions. On the other hand, men like Krause in Germany, Horsley in London, Cushing and Frazier in America, who devote a large part of their time and attention to this work, show results in striking contrast with the above. But in the hands of even these men a complete functional cure is an exception—so rare, in fact, M. Allen Starr felt warranted in publishing such a cure (operation by Cushing) under a separate title. Krause has reported a few complete functional cures. With respect to the approach in these cases, the men who have given the matter serious thought are divided into two camps: those who dislocate the cerebellum, and those who incise it or excise a portion thereof. If the cerebellum be dislocated, great care must be exercised that the medulla be not subjected to undue pressure, causing permanent

failure of the respiratory apparatus; if the cerebellum be incised or resected and if one be not careful and injure the dentate nucleus, the functional defect will be permanent. Cushing, with his broad exposure and careful handling of the small brain, has proven that such resections or incisions are, in the greater number of cases at least, unnecessary.

(Demonstration of Krause's vacuum tube for grasping brain-tumors to facilitate their removal.)

Harry M. Sherman: I hardly think, Mr. Chairman, that the criticisms of the gentlemen regarding the time which these patients were sent to operation, are justifiable. The first patient, for instance, came to his operation a little too soon; his tumor was subcortical, invisible and not palpable, and it could not be removed. With the second patient, the tumor is out and the patient is alive. The third patient was subjected to no delay and passed from one stage of his illness to the operation very quickly. The patient had had a brief history. Dr. Hyman refers to Starr's and Cushing's case. It has been a great sorrow to Dr. Newmark and myself that we did not have as good a record. Had I not made that hole in the dura mater I think we would have had very nearly as good a record.

In connection with what Dr. Hyman has said, that "most men who report single cases report deaths," I want to make this point: To do the operation upon one of these patients I went, at the patient's wish, to a hospital at which I am not in the habit of operating—that is, to one in which I was not thoroughly at home, and where I did not know the names of the operating-room staff nor just what was their function and ability. No matter how careful and considerate and helpful the operating staff at such a hospital may be, the visitor surgeon is still operating in an unfamiliar environment. He must constantly be watching, consciously or unconsciously, things which he, at his home hospital, is in the habit of having done for him by people to whom he is accustomed, and so he cannot concentrate his attention wholly on the work and his own hands. At the hospital to which I went I received every possible consideration and attention, and yet I have to think that if I had been at home I would not have wounded the dura mater of this patient and so have started a train of events that has lost us the best possible result. People who insist upon going to special hospitals for their own gratification, instead of to other hospitals to which their surgeons are most familiar, should be made to understand that they are possibly sacrificing the best attainable result for the gratification of a preference. For myself, if more of these patients present themselves, I shall claim the right to select, for their sake more than for my own, the place at which I shall do the work.

P. S.—The decompression suboptical tumor in case No. 2 was opened. Much cerebro-spinal fluid ran out and it was found that the mass of the tumor was a cyst, subcutaneous and divided in every direction by septa and fibrous bands. The cerebellar lobes were covered with the same fibrous material and it was impossible to identify the dura mater or any other anatomical tissues. Exploration was pushed fairly well into the left fossa, finding only the conditions as described. The attempt therefore to improve the condition did not succeed.
23 February, 1911.

CALIFORNIA ACADEMY OF MEDICINE, DEC. 22, 1910.

Demonstration of a Series of Sections of the Spinal Cord.

By MILTON B. LENNON, M. D., San Francisco.

Dr. Lennon demonstrated a series of sections, some showing the normal anatomy and others illustrating the common lesions of the spinal cord. The specimens were stained either by the Weigert Pal method or with the Haematoxylin Van Gieson stain. They were as follows:

1. An infantile cord.
2. The normal adult cord.
3. Sections from two cases of syringomyelia.
4. Myelitis luetica.
5. Amyo trophic lateral sclerosis.
6. The cord in beri-beri.
7. Tabes dorsalis.
8. Pernicious anemia.
9. Subacute combined degeneration (Collier and Batten), two cases, one annular in the distribution of the degeneration, the other diffuse.
10. Progressive muscular atrophy.
11. Family spastic paralysis (Newmark Type).
12. Epidemic cerebro-spinal meningitis.

The sections were all prepared since the fire in the Neurological Laboratory of the San Francisco Polyclinic.

Three Cases of Probable Cancer Transplantation from the Use of the Gilman Vaccine.

By W. B. COFFEY, M. D., San Francisco.

In a series of some 30 cases of cancer treated by operation for as complete a removal of the tumor as possible and at the same time by the vaccine method of Gilman, there were three cases that presented an unusual result, inasmuch as tumors developed at the site of the injection. The history of the cases is as follows:

Case 1.—Mrs. B. Previous operation for removal of uterus, right tube and ovary per vaginam, three months ago at Salt Lake City. Recurrent carcinoma involving vaginal wall, base of bladder; tumor mass in left pelvis. Sept. 19th—Laparotomy. Removal of mass involving the left tube, ovary, posterior surface of bladder. Vaccine prepared and tissue referred to Dr. Walter Gibbons for examination. Sept. 20th—Inoculation Gilman method in upper right abdominal region. Three hours following operation severe twitching of muscles of face, followed by unconsciousness and general convulsion. Two similar convulsions the same evening. These epileptiform attacks lasted from 10 to 15 minutes. No previous history of epilepsy. Oct. 14—Gilman injection and tissue removed from another individual, adeno-carcinoma of breast. Reaction slight. Tumefaction at point of injection disappearing at end of week. Oct. 14th—Gilman injection made from previous growth. Reaction slight; tumefaction and pain disappearing in one week. Oct. 25th—Injection from adeno-carcinoma from another individual. Nov. 1st—Similar injection from another individual. These injections were made at various points in the abdominal wall. The first injection, the one that was autogenous, was the only one in which tumefaction remained. In the course of two weeks segregated into nodules. Six weeks following the initial dose the nodules so increased in size that the patient complained of pain on palpation or muscular effort. At the end of the twelfth week the nodules increased to the size of a walnut. Under local anesthesia they were removed. The chain of nodules was situated in the subcutaneous tissue at the point of first injection. Tissue referred to Dr. Gibbons for examination. First vaccination autogenous, kept in carbolic acid 5% for 24 hours on ice and yet followed by tumor at site of injection.

Case 2.—Mrs. C. Immovable, inoperable carcinoma of uterus. Sept. 14th—Removal of section of cervix sufficient for one dose of the vaccine. Inoculation same day. Specimen examined by Dr. Gibbons. Sept. 26th—Similar inoculation from another individual,—growth adeno-carcinoma of breast. Oct. 12th—Autogenous vaccine made from tissue removed from uterus by currettment. Nov. 22nd—Similar procedure. The tumefaction resulting from the primary inoculation of Sept. 14th gradually increased to the size of a walnut and became painful.

The inoculation of Sept. 26th, Oct. 12th and Nov. 22nd tumefactions disappeared after one week. In this case the first, third and fourth were autogenous; the second, from the material of an adeno-carcinoma breast case of another individual. The tumefaction of the second, third and fourth disappeared in the period of one week. The initial dose, which was autogenous, gradually developed a tumor mass, which was removed at the end of eight weeks. Referred to Dr. Gibbons for examination.

Case 3.—Mr. R. Previous operation one year ago—epithelioma of right side of tongue. Second operation six months later—secondary involvement of glands of neck. Rapid recurrence with subsequent necrosis of soft tissues of neck. Sept. 13th—When he came under my care the posterior deep cervical glands were removed, receiving an autogenous vaccine the same day. Sept. 25th—Second autogenous vaccine. Tumefactions from these autogenous vaccines disappeared at the end of a week. For want of further material he was not injected again until Oct. 14th, when he received an injection of vaccine from a breast (adeno-carcinoma). Oct. 24th—Further dissection of glandular involvement sufficient for an injection was removed from his neck and injected in the lower part of the left abdomen. Nov. 7th—Injection from a breast adeno-carcinoma. In this case the first two injections were autogenous, the tumefactions entirely disappeared; the injections of Oct. 14th and Dec. 7th disappeared, but in the one of Oct. 24th (autogenous) the tumefaction gradually increased in size. My assistant, under local anesthesia, removed a section of same for Dr. Gibbons. Since removing this section for examination the remaining tumefaction is rapidly increasing in size. The first, second and fourth were autogenous. The third and fifth from a breast adeno-carcinoma. The fourth vaccination developed the tumor. In every case the tumor was ground to the point supposed to destroy as many of the cells as possible and kept for at least three hours in a 5% carbolic acid solution. In Case 1 the material was kept nearly 24 hours.

All pathologic examinations were made by Dr. Walter Gibbons and the Noguchi and Wassermann reactions were done by Dr. Grace Linforth. It will be seen that in each instance it was a tumor precisely like the original growth that developed at the site of inoculation which was in each case the abdominal wall. Each patient received other injections, but in these three the tumor developed after the use of an autogenous vaccine, and in no case where the vaccine came from the tumor of another patient was there any sign of tumor development. This follows the rule that cancer cells are more dangerous to the host than to any one else.

It is hardly fair to use this fact in any way but as a warning. It has been generally supposed that transplantation was exceedingly difficult except in the immediate neighborhood of the tumor as shown by operative recurrences where the original tumor has been cut through. There is no recorded case of a surgeon or pathologist developing cancer from injury to the hands while handling cancer tissue, and in animal experiments keeping an easily transplantable tumor at room temperature for a few hours is sufficient to prevent the transplant from developing. All of these injections were made from material prepared as nearly as possible after the method advised by Dr. Gilman and contained 5% carbolic acid. Two of the cases received respectively two and four injections from cancer tissue from other and not similar tumors and there were no developments at the site of these injections.

Discussion.—H. A. L. Ryfkogel: For many years surgeons have been well aware that in operations for the removal of carcinomatous tissue, great care is necessary to avoid contamination of the non-invaded tissues, and when the cancer has been entered accidentally they have very carefully discarded the infected instruments and used the cautery or fluids such as Harrington's solution in order to seal over the exposed malignant surface. Many investigators such as Van Leyden, although recognizing the possible value of cancer vaccine methods, have hesitated to make injections of living cells, stating specifically that they did not dare to inoculate a patient with the very cells they had used such care to destroy. Innumerable clinical cases have attested that this fear is not unfounded and there should be no surprise that growths similar to the original should have occurred at the point of inoculation in Dr. Coffey's cases. It is particularly interesting to note, however, that in his case growth has only occurred when the patient's own tumor was injected. This is also in line with previous observations—for instance, no infection of a surgeon by cancer material while operating has been recorded. That certain tumors can be cured by the injection of cancer emulsion has been demonstrated by Dr. Gay of the University of California. Dr. Gay has shown that the history of certain implanted tumors can be divided into two periods rather sharply defined. First, the premetastatic, and second, the metastatic. During the first an injection of emulsion of homologous tissue causes the rapid disappearance of the growth. During the second no improvement occurs. Blumenthal caused a spontaneous rectal carcinoma of a dog to disappear by injecting an emulsion of part of the same tumor. He also cured sarcoma in dogs by vaccine. He found also that if this emulsion was autolyzed in the incubator for three days it no longer produced tumors when injected into the non-infected animals, nor had lost any of its therapeutic properties. In three weeks, however, it became inert. Vaughn, of Detroit, claims to have brought about improvement and prevented recurrence in human carcinomas by the use of a proteid split off cancer material. He has performed no animal experiments. That the body can destroy cancer cells and normal cells is well known and it is probable that a cure of cancer will be brought about by increasing the normal resistance of the body to the invasion of cancer cells. Whether this will be by means of vaccine or other methods must be determined in the future.

Stanley Stillman: I have had very limited experience with this method of treating cancer, and have been unwilling to use it to any extent for the reasons already stated by Dr. Ryfkogel. I have seen several cases in which recurrence of cancer has taken place in and around the field of operation, which was unquestionably due to infection at the time of the operation, and hence I have been unwilling to inject the material obtained from an individual's own growth. In one case, however, of recurrent cancer of the breast, in which the material injected was obtained from another patient, I have seen very marked improvement. Metastases in the skin softened and healed without ulceration, pain almost disappeared, and a mass in the root of the neck has perceptibly diminished in size and is much softer. Whether this is entirely due to the injection I am not able to say, but I have some doubt of it because the case shows remarkable spontaneous resistance to cancer. One breast was removed seven years ago and the other one the following year; and while there have been cancerous nodules and enlarged glands in the breast five years, the patient was still holding her own at the time of the injection, although suffering much pain. Then, too, the material used in this case was particularly favorable, possibly because the growth from which it was obtained was quite liquefied in its interior, and ought to furnish an unusual amount of antibodies. As stated by Dr. Coffey, there seems to be little likelihood of producing cancer at the site of injection when the material is obtained from another individual. I am not willing to inject a patient upon which I have already done a very radical piece of work for cancer, with material obtained from his own growth, for I know that there is danger of producing cancer at the site of the injection.

SOCIETY REPORTS

CALIFORNIA ACADEMY OF MEDICINE.

The California Academy of Medicine held its regular meeting on Monday evening, Jan. 23rd. The scientific program was as follows:

1. A Report and Exhibition of Border Line Cases, with demonstration of X-Ray plates. C. M. Cooper and Geo. L. Painter.

Discussed by Drs. Newton, Moffitt and Cooper.

2. Pure Food Lore for Physician and Patient. Prof. M. E. Jaffa.

The following were duly elected to membership: Drs. Gay, Meyer, Zinsser, Crawford, Rusk, Hoag, Eloesser, Lee and Schmitt.

Refreshments were served at the close of the program.

COOPER COLLEGE SCIENCE CLUB.

The regular meeting of the Cooper College Science Club was held on Wednesday, January 18, 1911, at 8:30 p. m. The scientific program was as follows:

1—A Case of Volkman's Ischaemic Contracture, by M. E. Rumwell. Discussed by Drs. Huntington, Stillman, McClenahan and Rumwell.

2—Three Cases of Late Congenital Syphilis of Viscera, by Wm. Fitch Cheney. Discussed by Drs. Cooper, McClenahan and Cheney.

3—A Case of Pleuro-Pericarditis with Obstruction of the Inferior Vena Cava, by W. R. P. Clark. Discussed by Dr. Cooper.

Refreshments were served at the close of the program.

COOPER COLLEGE SCIENCE CLUB.

The regular meeting of the Cooper College Science Club was held on February 6, 1911. The scientific program was as follows:

1—(a) A Case of Polycythemia with Splenomegaly.
(b) A Case of Alkaptonuria with Pigmentation of Skin and Cartilages. (Major P. M. Ashburn, United States Army.)

Discussed by Dr. W. C. Alvarez.

2—A Case of Cervical Adenitis with Medical and Surgical Treatment, with demonstration. (Adelaide Brown, M. D.)

Discussed by Drs. Stillman, Winterberg, Sewall, Wilbur, Clark, Eloesser, Gray, Dickson, Brown.

3—Xanthelasma, with demonstration of cases. (G. H. Mize, M. D.)

Discussed by Drs. Morrow, Friedlander, Alderson, Ophuls, Alvarez, Stillman, Haas, Ashburn, Mize.

Meeting adjourned.

MONTEREY COUNTY.

At the annual meeting of the Monterey County Medical Society the following officers were elected for the year 1911:

Dr. T. C. Edwards, president; Dr. A. M. Ritchie, vice-president; Dr. H. T. Crabtree, secretary; Dr. John Parker, treasurer; Dr. H. B. Christiansen, censor; Dr. Garth Parker, delegate to State Society; Dr. W. A. Lillie, alternate.

The January meeting was held in Monterey. The February session will be at Salinas.

H. T. CRABTREE, Secretary.

SANTA CLARA COUNTY.

I herewith give you the names of the officers of the Santa Clara County Medical Society: President, Dr. Jonas Clark, San Jose; first vice-president, Dr. Wm. S. Van Dalsem, San Jose; second vice-president, Dr. Harry G. Reynolds, Palo Alto; third vice-president, Dr. Robert L. Hogg, Saratoga; secretary, Dr. W. T. McNary, San Jose; treasurer, Dr. H. J. B. Wright, San Jose; councillors, Dr. J. J. Kocher, Dr. Newel H. Bullock, Dr. Chas. M. Richards; delegates to State Society, Dr. Lincoln Cochran, Dr. Henry C. Brown; alternates, Dr. L. V. Saph, Dr. M. D. Baker, Dr. J. L. Benepu, Dr. Edward Holbrook.

W. T. McNARY, Secretary.

SANTA CLARA COUNTY.

Resolutions of respect, adopted by the Santa Clara County Medical Society to the memory of Drs. Elizabeth Gallimore and G. F. Witter, members of this Society recently deceased:

Whereas, Within the last year we have lost from our number, by the hand of the Great Reaper, two of our most esteemed members; and

Whereas, We, the members of the Society, feel deeply the loss of our co-practitioners; therefore

Resolved, That we, the committee appointed by the president, do express the feeling of the Society; and be it further

Resolved, That a copy of these resolutions be sent to the bereaved families, to the local press, the State Journal of Medicine, and a copy spread upon the minutes of the Society.

P. A. JORDAN,
J. W. PAUL,
Committee.

TULARE COUNTY ORGANIZED.

About twenty of the physicians of Tulare County, responding to an invitation sent out by the Secretary of the State Society and a personal letter from Dr. Austin Miller of Porterville, met at the Palace Hotel, Visalia, on the night of January 21st, and organized the Tulare County Medical Society. The Constitution and By-Laws recommended by the American Medical Association was adopted, and the following officers were then elected to serve for the year 1911: President, Dr. T. H. Blodget; vice-president, Dr. M. L. Petit; secretary-treasurer, Dr. F. L. Stallings. A number of physicians in the county, who could not be present at the meeting for organization, have sent in their names and expressed a desire to join the society, so that it starts out with something like thirty members. We certainly extend the best of good wishes to this newest of our component societies, and sincerely wish for it a long and a successful life.

BOOK REVIEWS

Three Contributions to the Sexual Theory. Sigmund Freud, LL. D., Vienna. Jour. of Nerv. and Ment. Dis. Monograph series No. 9, 91 pages.

This brief monograph, as the title signifies, deals with the sexual problem. It may be characterized, in fact, an an outline sketch of a new system of clinical psychology. Whether or no, therefore, one chooses to accept the author's doctrine, it is extremely interesting to follow the thread of his argument, if only to ascertain in what essential points he diverges from current beliefs.

It is a curious fact that the repressive faculties which normally relegate the sexual activities to a circumscribed sphere and stamp the individual with a certain seal of morality, naturally awaken both disgust and repugnance at the thought of permitting the mind to engage in such studies. It is for this reason, most likely, that the works of Havelock Ellis and Krafft-Ebing, instead of contributing to the information of the cultured classes, are to be found upon the shelves of every second-hand book shop, side by side with the cheap salacious literature which circulates in the under-world.

Brushing aside prejudice, Freud boldly sounds the depths of the great uncharted sea of sexuality which

everywhere lies hidden beneath the social fabric, and reveals laws of ebb and flow hitherto unsuspected. With the subtle judgment of a trained psychologist, moreover, he treats the subject with such consummate tact as never to weary the attention. He bears one swiftly forward on the current of his logic. One feels at once the impact of a magnetic and vigorous mind whose lance-pointed intuitions are ever controlled by sober judgment. Indeed, one cannot escape the impression that he holds a tremendously strong imagination in check whilst, with singular felicity of expression, he outlines the principles of his philosophy. These three brief essays, alone, sufficiently manifest his extraordinary acuteness of intellectual vision. It remains to be seen, however, to what extent his theories will gain acceptance.

His method is partly analytical, partly synthetic. His professed object is a reconstructive and analytical study of the psycho-neuroses. Perhaps the main thought may be stated by saying that just as in the reversed reactions of bio-chemistry we witness dissociation and reunion occurring in the same system, so, in the psycho-neuroses, there is a similar relation to primitive elements, which, latter, are to be sought in the sexual manifestations of infancy and early childhood. In other words, between the two states a more or less definite isomerism exists. The conception is brilliant and not without foundation. Like the mysteries of serum therapy, however, his theory draws us enticingly towards the unknown, only to emphasize at the last our utter dependence upon vitalism.

In these essays the author deals with general principles only. No account is given of his method of treatment. C. Q.

Diseases of the Anus, Rectum and Sigmoid. By Samuel T. Earle, M. D., Professor Emeritus of Diseases of the Rectum in the Baltimore Medical College. 476 pages with 152 illustrations. J. B. Lippincott Co., 1911.

This volume from the pen of Dr. S. T. Earle is bound to be of value to anyone interested in diseases of the anus, rectum and Sigmoid-Colon.

Almost since the inception of the American Proctologic Society Dr. Earle has been selected to review at each annual meeting the proctologic literature of the previous year. His accessibility to the Surgeon General's library at Washington has kept him in touch, and has made him familiar, with everything on the subject. One would therefore look to his book for the latest and best things gleaned from the field of proctology. And there is no disappointment, for throughout the book one can see, and marvels much at, the vast amount of literature that has been perused and edited by the author.

The opening chapter on the anatomy and physiology is brief but all sufficient. The illustrations of the fine dissections of Dr. Arthur Hebb, who has long been associated with Dr. Earle, are especially to be commended. A very good description of the inverted position for proctoscopic examination and treatment, as devised by Mathews and Hanes, will be found in the chapter on diagnosis and examination. To those who place much value on the use of spinal anesthesia in rectal surgery it will perhaps seem rather strange to read Dr. Earle's dictum that he cannot consistently recommend its use. The section on constipation is a very good one. While of necessity it cannot deal with the details to be found in such a book as Gant's latest work on Constipation, yet it will be of worth to the busy practitioner who above all desires multum in parvo.

Like most recent writers on this subject Earle advises that excision should supplant forcible dilatation, so much in vogue among the general surgeons, in all cases of chronic fissure in ano. It is with surprise that one notes the absence of any reference to Beck's method of treating fistulae with the injection of bismuth paste. This deserves mention even were it only used as a diagnostic method in conjunction with the Roentgen rays. Earle's modification of the Whitehead operation, which does away with most of the objections urged against the latter is described at length in a well illustrated chapter. The illustrations of pathological growths are also all new and of much value.

Dr. Earle has drawn liberally upon, and very generously credited, the writings of the Fellows of the American Proctologic Society. After a labor of many months he has produced a volume that is an index of the scholarly attainments and professional skill of its author. It will be a welcome addition to the library of every specialist, and is a book that should be referred to with confidence by anyone who only occasionally needs its aid. A. J. Z.

Handbook of Electro-Therapeutics. By Wm. J. Dugan, M. D., Lecturer on Electro-Therapeutics in Jefferson Medical College, Philadlphia; Physician-in-Charge of Electro-Therapeutic Department, Jefferson Hospital; Fellow of the American Electro-Therapeutic Association, etc. 242 pages; illustrated. F.-A. Davis Co., Philadelphia, Pa., 1910.

This book contains a good deal of useful information for the student, but for the advanced worker is too general in its scope, and obviously a scientific grounding in electricity is taken for granted.

The author tries to cover too large a field, touching on all forms of electricity, magnetism, vibration and X-ray.

Special attention is paid to the explanation of the electrical apparatus to select and how to use it. The appendix discusses some of the latest thoughts on death by electricity and resuscitation of persons shocked by the electric current. The work as a whole can only be recommended as an elementary book. N. S.

NEW MEMBERS.

White, G. R., Auburn.
Pearson, R., Sacramento.
Gearhart, S. C., Challenge.
Lantz, Viola, San Jose.
Howell, H., San Jose.
Posey, A. C., San Jose.
Higgins, O. C., Porterville.
Preston, A. W., Visalia.
McLean, A. D., Exeter.
Chilson, W. C., Tulare.
Martin, L. A., Pt. Richmond.
Okanogi, B., Fresno.
Horstman, Elsa A., Los Angeles.
Breed, L. M., Los Angeles.
Ashby, R. H., Roseville, Calif.
Sunburnt, W. I., Floriston, Cal.
Burch, E. L., Raymond, Cal.
Hilliard, C. G., Redlands, Cal.
Hanvey, C. B. H., Oakland.
Rossin, J. B., Tulare.
Barber, S. A., Porterville.
Bond, Hughes, Lindsay.
Blackledge, L. N., Ora.
Miller, Austin, Porterville.
Fuller, R. N., Tulare.
Beck, J. E., Tulare.
Mix, P. A., Exeter.

RESIGNED.

Outwater, S. R., Riverside.
Hewlings, Hester A., Address unknown.
Grimes, W. V., Pacific Grove.
Rankin, J. E., Gonzales.

DEATHS.

Rottanzi, T. A., San Francisco.
Craig, L. A., San Francisco.
Thrasher, C., San Francisco.